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PSYCHIC DISTURBANCES IN CHILDREN WITH CHRONIC ILLNESS

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The behavior problems attendant upon chronic diseases in children have long been recognized. In certain conditions their appearance is so common as to form an integral part of the underlying disease picture; thus, it is almost expected that the diabetic child will steal, the asthmatic will develop hypochondriacal traits, and the child with cardiac disease will become neurotic. That the psychic factor is a distinct entity and should be separated from the physical component has been stressed repeatedly. However, in most cases the psychiatric problem is not dealt with until after psychic factors have become established.

It would seem, then, that the pediatrician pays little attention to psychogenic features of illness in children. His task is to deal with these children at the inception of their illness, and he has an unparalleled opportunity to anticipate early behavior problems before they become full-blown complications of an organic illness. Thus the parent of a child with asthma should be cautioned against the development of hypochondriacal traits in the child when the diagnosis of asthma is established. The statement of Alvarez[1] that "The gastro-enterologist just has to be a psychiatrist of sorts" may be equally well applied to the pediatrician.

Factors Responsible for Psychic Disturbances

In a great measure the phobias attendant upon chronic illness in children are similar to the problems that confront the internist and orthopedist dealing with disabled adults. When an oversolicitous attitude is assumed by the parents, a situation that is already dangerous may quickly become desperate. A diagnosis of rheumatic fever in the only child of well-to-do parents sets the stage for the development of a psychic problem which is often more severe than the underlying physical disability. If such a situation is further complicated by an emotionally unstable patient or parent, then the physician may well weigh the consequences of his diagnosis and refrain from informing the parents as to his opinion.

Something must, however, be said in defense of such patients and their families. The guilt for the dilemma in which these people are cast must in a large measure be borne by the medical profession. Articles in current magazines are constantly warning parents of the ravages of a host of ills which range from asthma to whooping cough. With these partially digested facts and the rigidly restricted regimen of diet and activity—often delivered hurriedly and casually by a busy physician—parents have cause to become overanxious. To tell the mother of an asthmatic that the child must be carefully protected from overexertion, temperature changes, and respiratory infections, and then, at a later date, to scold because the child is being overprotected, is to retard recovery in the patient and lose face with the parent. Psychoanalytic studies of asthmatic children have shown repression and overanxiety to be prominent symptoms. These symptoms are but a natural consequence when little patients are placed upon a restricted regimen and parents are constantly reminded of the importance of close and con-

Read before the Section on Pediatrics, Medical Society of the State of North Carolina, Pinehurst, May 5, 1948.

1. Alvarez, W. C.: Nervousness, Indigestion and Pain, New York, Paul B. Hoeber, 1943.

stant supervision.

Poliomyelitis is another disease in which a similar behavior problem may arise under a comparable set of circumstances. Seidenfeld[2] found that 38 out of 100 patients with polio developed psychic problems severe enough for the parents to seek psychiatric aid. Children in the younger age groups became withdrawn and bewildered, while older patients were aggressive. Crying and instability in response to frustration were the most common early symptoms noted by Copellman[3], who also observed that the severity of the psychologic reactions was often independent of the severity of the disease.

If we are to consider the personality of the child, we must look beyond the child to his home, family, and economic background —for the child's personality is often a reflection of these factors. The majority of children plagued with chronic illness are from families in the lower-income groups—children dependent wholly or in part on clinics and charitable organizations. In another group, better off financially, the continued strain of a chronic illness soon reduces the family to a marginal classification where clinic aid must be accepted or the family budget dangerously strained. Economics then plays a vital role in determining psychic disturbances.

A family of modest means will insist at the onset that their child receive the best available medical attention, gladly making financial sacrifices to achieve this end. With the passage of months or years, however, when little improvement is evident, a resentment, conscious or unconscious, develops against the sick member. Even among clinic patients an analogous situation develops. The working mother of a diabetic patient, forced to spend long hours in the clinic with her child, will frequently become resentful. Resentment then plays an important role, spreading slowly like an indolent sore, retarding clinical improvement and adding "headaches" and frustrations for the now harassed physician.

When there are other children in the family group, these siblings may well provide a basis for friction even when the parents retain a balanced equilibrium. Solicitous and cooperative at first, they become resentful of the time and attentions bestowed upon the invalid member. When, with the passage of time, they are forced to make sacrifices of time and possessions, resentment increases.

2. Seidenfeld, M. A.: The Psychological Sequelae of Poliomyelitis in Children, Nerv. Child 7:14-28 (Jan.) 1948.
3. Copellman, F. S.: Follow-Up of 100 Children with Poliomyelitis, Family 25:289-297, 1944.

Means of Avoiding or Correcting Psychic Disturbances

Attempts at correction of the problems briefly stated above are best made at the onset of illness, or as soon as a positive diagnosis has been reached. Some physicians feel that warnings are premature or ill advised—fearing that to suggest the possibility of psychic disturbances is the best way of insuring their appearance. Such fears are not supported by experience, however. Warnings will not only prepare the parent, but will serve as the basis for dealing with problems should they subsequently appear.

If the parents have been forewarned, they may be able to avoid many of the usual sources of trouble. Brothers and sisters are told as frankly as possible just what the medical difficulty is, what must be expected, and what part, if any, they will be called upon to play. The patient, age permitting, should be dealt with just as frankly. Since the intelligence of these children is unimpaired, their understanding may help to a great degree in solving the problem. Self care should be stressed in an effort to develop the child's own will to improve. While motor activity must often be curtailed, no excuses should be accepted for a lag in mental activity. This point is important, and unfortunately is one which is often ignored by parents and society. Workers at Bellevue Hospital found that chronically ill children were far more content when school work was provided than they had been previously, and this finding has been substantiated repeatedly.

When a child with a chronic illness is seen by his physician for periodic examinations, it is essential that he understand the necessity for the visit. Some concrete statement regarding points of improvement or ways in which the patient has held his own will offer encouragement. Explanation of failure to improve is equally important, and must be understandable to both the child and the parents. The therapy must be carried further, with the introduction of some item of a previously determined plan—increased activity

for the rheumatic, passive exercise for the paralytic, a new food for the diabetic, an added contact for the asthmatic.

If the pediatrician contrasts his meticulous supervision of the acute stage of an illness with his casual attitude toward the chronic phase of the same illness, he will understand why parents are bewildered by what may appear to be indifference to the less dramatic stage of a disease.

If a program for convalescence or adjustment to the limitations of a disease is stressed at the follow-up medical examinations, many fears are allayed before they become serious. Necessary restrictions are enforced, needless restrictions are avoided, and much encouragement for the patient and the family will result from these visits.

An example of the effectiveness of this approach is the result of ambulatory treatment of rheumatic fever patients in the armed forces. First instituted in air corps hospitals, it was, with modification, adopted by other services[4]. Hohman[5] reports a series of cases from naval records. Sixty patients with rheumatic fever were divided into two groups and kept under six weeks' observation. The control group was kept on the usual regimen of bed rest, while the experimental group was allowed to be ambulatory as soon as possible and placed under psychiatric guidance. Measured by the usual physical and laboratory standards, there was no significant difference between the two groups except a uniform gain in weight in the experimental group and a uniform loss of weight in the control. The difference lay in the mental hygiene of the two groups, for the experimental group produced but one cardiac neurosis and one behavior problem, while the control group produced 17 cardiac neuroses and four behavior problems.

Men in the control group were offered the same diet and treated according to the accepted standard of rheumatic fever care. Those in the experimental group were carefully briefed as to the nature of their illness, warned about the development of neurotic tendencies, and allowed to be ambulatory as soon as their physical status permitted. They were provided with recreational facilities and invited to participate in round-table discussions of rheumatic fever. These patients were young male adults, and no attempt is made to justify the use of this procedure in similar cases of infants and children. The report does, however, prove convincingly the values of psychiatric and occupational therapy as an adjunct to the medical treatment of chronic illness.

The application of any educational plan to care for invalid children is fraught with difficulties. Yet, for many reasons, such a plan is necessary, and facilities to make it practicable should be included in any long range planning of progressive communities. The employment of tutors or paternal supervision is seldom feasible.

The question of economic aid is another which is beyond the realm of any individual practitioner. However, the National Foundation has admirably cared for poliomyelitis victims. Progress in this direction is being made in the case of rheumatic fever, and extensions of existing agencies or the creation of new funds may conceivably provide care for other children similarly afflicted.

4. Robertson, H. F., Schmidt, R. E., and Feiring, W.: Therapeutic Value of Early Physical Activity in Rheumatic Fever; Preliminary Report, Am. J. M. Sc. 211:67-73 (Jan.) 1946.
5. Hohman, L. B.: A Psychiatric and Physical Evaluation of the Treatment of Acute Rheumatic Fever in Young Adults by a Psychiatric Ambulatory Method Compared with the Classical Bed-Rest Immobilization, Digest Neurol. and Psychiat., Hartford, Connecticut, The Institute of Living, Series XV, December, 1947, pp. 698-706.

Discussion

Dr. Samuel F. Ravenel (Greensboro): This paper takes up a phase of pediatric care that is too often neglected by many of us. We do a great deal for the child when he is acutely ill, and then when he stumbles out of acute illness into a subacute or chronic phase we are inclined to let him get along as best he can. If we think of the possible psychiatric sequelae and implications of those acute illnesses, we will probably prevent many behavior problems.

Dr. Charles H. Gay (Charlotte): About six months ago I saw a child who had been carried by his mother for almost two years of his life, because the doctor had told her that the child had a congenital heart disease and should not be allowed to exert himself. That child was made an invalid for two years, before an examination showed that the defect was very mild. Then, after six months' guidance, that child turned into a perfectly normal, active child. The whole family situation before revolved entirely around the child, and now they are beginning to get to the stage where the child fits very nicely into the normal family pattern. At the meeting of the American Academy of Pediatrics last week in Buffalo a number of the speakers brought out the same general theme—that many patients with congenital heart lesions should not be made invalids, and can actually lead a very normal life.

The infected infant may be able to overcome tuberculous infection if the adult contact can be promptly removed. If, however, the contact remains and the baby is subjected to a constant opportunity for more infection, there is much greater likelihood of a serious, or even fatal outcome.—E. L. Kendig, M.D., and J. B. Hardy, M.D., South. Med. Jour., April, 1946.

GENERAL REMARKS ON POTT'S FRACTURE

LENOX D. BAKER, M.D.

DURHAM

"No part of surgery is thought to be so easy to understand, as that which relates to fractures and dislocations. Every, [even-ed.] the most inexpert and least instructed practitioner, deems himself perfectly qualified to fulfill this part of the chirurtic art: And the majority, even of these, are affronted by an offer of instruction, on a subject with which they think themselves already so well acquainted.

"This is also the opinion of a considerable part of the people. They regard bone-setting (as it is called) as no matter of science; as a thing which the most ignorant farriar may, with the utmost ease, be come soon and perfectly master of; nay, that he may receive it from his father and family as a kind of heritage." Thus wrote Percivall Pott in 1768 in his introduction to "General Remarks on Fractures and Dislocations."[1]

What might have been true in the times of Pott is not necessarily true today. However, management of the fracture about the ankle commonly associated with his name is fraught with much difficulty. Despite its frequency and the well established principles of its treatment, avoidable complications are seen far too frequently, and it behooves all who attempt to treat this fracture to take stock occasionally in order to evaluate better their methods of treatment and their end results.

This paper is the fourth paper on the subject of fractures[2] read by a member of our staff before this Society in the past five years. As in the past, we have selected for discussion a relatively common fracture, frequently treated by the family physician.

Classification of Fractures about the Ankle

In his original thesis Pott described an injury consisting of a fracture of the fibula, a partial dislocation of the ankle, and a laceration of the ligaments that fasten the tibia to the astragalus and to the os calcis. Cotton[3] and others have added new descriptions and classifications of various fractures about the ankle, and there are numerous names associated with the more common ankle fractures. However, all can be classified as abduction or adduction fractures with or without dislocation. The dislocation may be to either side, forward or backward. The fracture may involve only one malleolus, or it may be bimalleolar or trimalleolar. (The posterior lip of the articular surface of the tibia is now referred to as the posterior malleolus of the tibia.)

Pathology

Little has been or can be added to Pott's original description of the pathology, and of the principles of the treatment of these fractures. A part of his description is therefore quoted:

"A case [fracture—ed.] which, according to the general manner of treating it, gives infinite pain and trouble both to the patient and surgeon, and very frequently ends in the lameness and disappointment of the former, and the disgrace and concern of the latter—I mean the fracture of the fibula attended with a dislocation of the tibia. Whoever will take a view of the leg of a skeleton, will see that although the fibula be a very small and slender bone, and very inconsiderable in strength, when compared with the tibia, yet the support of the lower joint of that limb (the ankle), depends so much on this slender bone, that without it the body would not be upheld, nor locomotion performed, without hazard or dislocation every movement . . . This lower extremity of the fibula has, in its posterior part, a superficial sulcus for the lodgment and passage of the tendons of the peronei muscles, which are tied down by strong ligamentous capsulae, and have their action so determined from this point or angle, that the sequence of external force, must necessarily have considerable effect on the motions they are designed to execute, and consequently distort the foot."

" . . . it will obviously appear to every one who examines the ankle that the support of the body, and the due and proper use and execution of the office of the joint of the ankle, depend almost entirely on the perpendicular bearing of the tibia upon the astragalus, and on its firm connexion with the fibula. If either of these be perverted or prevented, so that the former bone is forced from its just and perpendicular position on the astragalus; or if it be separated by violence from its connexion with the latter, the joint of the ankle will suffer a partial dislocation internally; which partial dislocation cannot happen without not only a considerable extension, or perhaps laceration of the bursal ligament of the joint, which is lax and weak, but a

From the Orthopedic Division of the Department of Surgery, Duke University School of Medicine, Durham, North Carolina.

Read before the Section on Surgery, Medical Society of the State of North Carolina, Pinehurst, May 4, 1948.

1. Earle, J.: Chirurgical Works of Percivall Pott, F.R.S. Surgeon, St. Bartholomew's Hospital, a new edition with his last corrections, London, Wood & Sines, 1808, v. 1.
2. (a) Baker, Lenox D. and Schaubel, Howard J.: Operative Treatment of Fracture of the Patella, North Carolina M.J. 4:382-384 (Sept.) 1943. (b) Raney, R. Beverly: The Treatment of Fractures of the Humerus with the Hanging Cast, North Carolina M. J. 6:88-92 (Feb.) 1945. (c) Baker, Lenox D. and Schaubel, Howard J.: Complications of Colles' Fractures, North Carolina M. J. 7:457-462 (Sept.) 1946.
3. (a) Cotton, F. J., Tr. Orthopedic Section, American Medical Association, 1914. (b) Cotton, F. J.: Dislocations and Joint Fractures, ed. 2, Philadelphia, W. B. Saunders & Company, 1924.

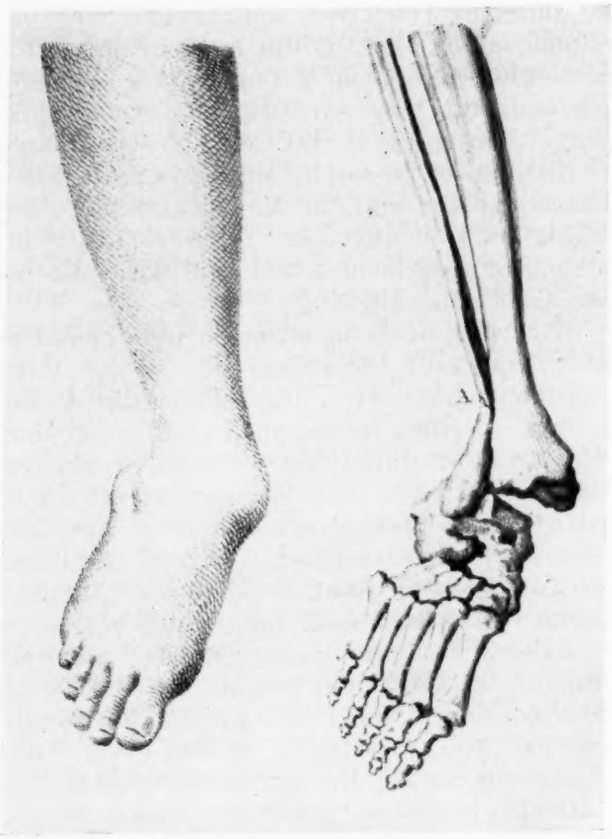

Fig. 1. Pott's original illustration of the fracture now known by his name[1].

laceration of those strong tendinous ligaments, which connect the lower end of the tibia with the astragalus and os calcis, and which constitute in great measure the ligamentous strength of the joint of the ankle. This is the case, when, by leaping or jumping, the fibula breaks in the weak part already mentioned; that is, within two or three inches of its lower extremity. [Fig. 1] When this happens, the inferior fractured end of the fibula falls inward toward the tibia, that extremity of the bone which forms the outer ankle is turned somewhat outward and upward, and the tibia having lost its proper support, and not being of itself capable of steadily preserving its true perpendicular bearing, is forced off from the astragalus inwards, by which means the weak bursal, or common ligament of the joint is violently stretched, if not torn, and the strong ones, which fasten the tibia to the astragalus and os calcis, are always lacerated; thus producing at the same time a perfect fracture and a partial dislocation, to which is sometimes added a wound in the integuments, made by the bone at the inner ankle. . . . When this accident is accompanied, as it sometimes is, with a wound of the integuments of the inner ankle, . . . it not infrequently ends in a fatal gangrene . . . But in its most simple state, unaccompanied with any wound, it is extremely troublesome to put to rights, still more so to keep it in order, and unless managed with address and skill, is very frequently productive both of lameness and deformity ever after."

Treatment

In outlining treatment, Pott condemned any efforts at reducing the fracture with the limb extended at the knee and stated,

"This extension occasions the difficulty in reduction, and the difficulty in keeping it reduced . . . but if the position of the limb be changed . . . with the knee moderately bent, the muscles forming the calf of the leg, and those which pass behind the fibula and under the os calcis, are all put into a state of relaxation and non-resistance, all this difficulty and trouble do in general vanish immediately; the foot may easily be placed right, the joint reduced, and by maintaining the same disposition of the limb, every thing will in general succeed very happily, as I have many times experienced."

As has already been said, little has been or can be added to Pott's description of this fracture and of the principles of its treatment. However, the failure to perform properly certain details in the reduction and fixation of Pott's fracture may lead to "lameness and disappointment."

The time allotted for presenting this paper does not allow a detailed description of the signs of Pott's fracture, nor a description of all the accepted methods of reduction. The following principles may be stated as holding true regardless of the method used:

Roentgenographic examination

Roentgenograms should be made of all injured ankles. In addition to the usual anteroposterior and lateral films, oblique views should be included in order to visualize diastasis.

Anesthesia

General or spinal anesthesia is preferable to local anesthesia.

Reduction and application of cast

Traction in the line of deformity to realign the fragments is the first and most important force to be applied. This traction should be applied with the patient's knee flexed to a 90 degree angle and with counter traction applied over the posterior aspect of the thigh just above the knee by an assistant, by a fixed strap, or (preferably) by the end of the table. Counter traction thus applied allows for relaxation of the musculature of the leg.

If anatomic restoration is to be secured, manipulation should be directed toward bringing the astragalus into alignment with the tibia, realigning the fracture fragments, restoring the joint mortice and reducing the fracture of the posterior malleolus or lip of the tibia, if such a fracture is present. When the distal fragments and the astragalus are reduced, traction must be maintained with a forward force to prevent recurrence of backward dislocation. The foot should be placed at an angle of approximately 90 degrees to

Fig. 2 (A). With the patient anesthetized and the knee of the injured extremity flexed over the edge of the table, the operator applies traction. (B) When the cast is completed about the ankle and leg, it is extended out over the forefoot. (C) An additional plantar splint may be applied and molded to support the longitudinal and metatarsal arches. (D) A section of an automobile tire with good tread makes a satisfactory weight-bearing appliance.

the leg, or in slight plantar flexion. Care must be taken not to overdorsiflex the ankle, as the astragalus (which is wider in the front than in the back) will force the malleoli apart, thus spreading the ankle mortice[4].

Figure 2a shows the position of the operator for reduction of an abduction fracture. One hand grasps the heel, with the thumb placed medially and just above the inner malleolus. The other hand grasps the lateral malleolus and the foot. Traction is applied and the astragalus and the foot are forced inward with the outer hand, but the foot is not supinated. The astragalus is aligned with the tibia, and the os calcis with the foot in the mid position.

4. Ashhurst, A. P. C. and Crossan, E. T.: Prognosis and Treatment of Fractures of the Tibia and Fibula, Tr. Am. Surg. Assoc. 41:594, 1923.

Following reduction, the forefoot may be supported by resting the head of the fifth metatarsal lightly on the operator's knee, or an assistant may support the forefoot. A long, thoroughly soaked wet plaster splint is then placed in sugar-tong or stirrup fashion about the leg, the ankle, and the posterior part of the foot. This plaster slab should be well molded and held with plaster bandages (fig. 2b).

We use the unpadded cast. If the unpadded cast is not used, the plaster stirrup should be put on unpadded; a light layer of glazed cotton may then be wrapped on in a circular fashion before applying the circular plaster bandage. It has been our experience that, with proper precautions and care, less circulatory embarrassment, fewer pressure sores, and better fixation result with the unpadded cast than with the padded cast.

After the sugar-tong splint has been well molded, an additional plantar splint may be applied and molded to support the longitudinal and metatarsal arches (fig. 2c). When completed, the dorsal surface of the cast should extend to the web spaces of the toes. The plantar surface should extend to the tips of the toes.

If the fracture has been properly reduced, and the foot has been put into an anatomic position, weight-bearing forces will not disturb the reduction. The active use of the limb stimulates union and prevents circulatory stasis, atrophy, and stiffness A section of an automobile tire with good tread makes a satisfactory weight-bearing appliance. The tread is applied in weight-bearing alignment, with a firm block of sponge rubber between it and the cast (fig. 2d). The tread and the sponge rubber are held in place by an additional circular plaster of paris bandage. Regardless of the type of cast applied, either padded or unpadded, any sign of circulatory embarrassment, no matter how mild, is sufficient reason to split the cast.

Treatment following reduction

In all instances, post-reduction x-rays should be made to be sure that the ankle mortice has been restored, that the fibula is in normal alignment, and that the dislocation is reduced. In the anteroposterior film, the superior articular surface of the astragalus must be in anatomic relationship with the articular surface of the tibia. In the oblique film the lower tibiofibular articulation must be in normal relationship In the lateral

films, the superior articular surface of the astragalus must be in contact with the anterior portion of the articular surface of the tibia.

A posterior fragment from the lip of the tibia, if it includes an appreciable amount of the articular surface, should be brought into normal relationship. Otherwise the position of this fragment is not particularly important. It will often be impossible to correct its slight upward displacement, but as long as it is displaced away from the joint rather than into the joint, exact reduction is unimportant.

Immobilization should be continued until bony union has occurred. This usually requires at least ten weeks. On removal, if the fracture has been treated with a weight-bearing cast, the ankle and the foot can be taken through approximately a normal range of motion. Following removal of the cast a jelly bandage will usually be found of benefit in preventing recurrent swelling. Such support should be continued for several weeks if necessary.

The patient or those responsible for the patient should be supplied with instructions for observing signs of circulatory changes. A satisfactory fracture instruction sheet is as follows:

DUKE HOSPITAL
Durham, N. C.

ACCIDENT DEPARTMENT
INSTRUCTIONS TO FRACTURE CASES

It is important that the circulation of blood in the fractured limb be watched closely. In order to watch the circulation, the fingers or toes of the fractured limb have been left exposed.

Keep the injured part elevated. If the exposed parts become BLUISH, SWOLLEN, COLD OR NUMB, return AT ONCE to the hospital. Otherwise, PERMANENT INJURY MAY RESULT.

Return to the hospital tomorrow as instructed by the doctor who set your fracture, so that he can inspect the cast, circulation, etc. Following this, come to the Fracture Clinic as instructed on Friday at 8:30 A.M. until discharged.

I have received a copy of the above instructions which have been explained to me and are clear as to details.*

Signed.....

*Explain and give one copy of instructions to the patient and attach a signed copy to the record.

The Hazards of Open Reduction

Unfortunately in the past few years several articles have appeared in the literature recommending open reduction and some type of internal fixation in fractures about the ankle. Figure 3 is a good example of the foolhardiness of such measures. In this instance, the surgeon has done an open reduction and has inserted a screw through a posterior fragment of the tibia. Failure to reduce such a fracture by conservative measures will usually be followed by the same failure when surgery is resorted to. In this case there is nonunion of the medial malleolus, and the joint mortice has not been restored. In spite of the open reduction for the posterior fragment, its position has not been changed. Compare figure 3 with figure 4, in which relatively the same fracture has

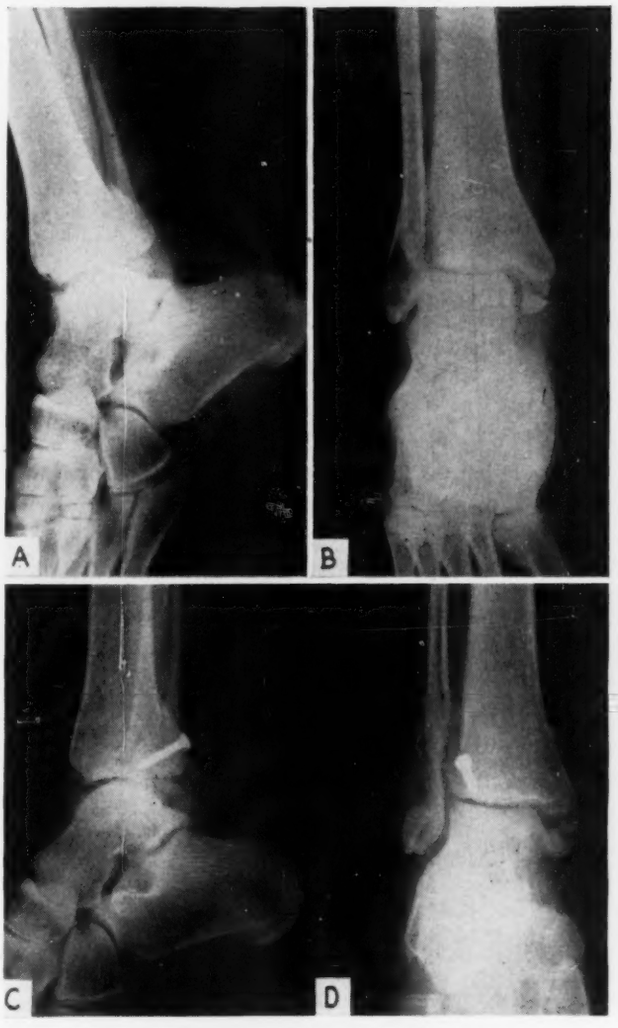

Fig. 3. (A) Lateral view of a trimalleolar fracture with a small posterior fragment and very little interference with the weight-bearing surface of the tibia. (B) Anteroposterior view showing slight lateral displacement of the astragalus and fracture of the medial and lateral malleoli. (C) An open reduction has been done, with the screw inserted through the posterior fragment of the tibia. (D) There is nonunion of the malleolus, and the joint mortice has not been restored. The astragalus shows lateral luxation, and the position of the posterior fragment has not been changed.

Fig. 4. (A) Preoperative film of a fracture similar to the one illustrated in figure 3, but with more comminution of the lateral and medial malleoli and a greater posterior luxation.

Fig. 4 (B). Conservative therapy consisting of manipulation with the patient anesthetized and the knee flexed at a 90 degree angle has restored satisfactory alignment to all fragments and has reduced the lateral luxation of the astragalus.

occurred with severe comminution of the lateral malleolus. By traction and manipulation all fracture fragments were aligned and the luxation was reduced; the posterior fragment is in a satisfactory position, and the joint mortice is restored.

Treatment of Uncomplicated Malleolar Fractures

Malleolar fractures without luxation of the joint and without displacement of the fragments should be treated symptomatically. Frequently procaine injection followed by heavy adhesive strapping or by the application of a Delbet cast[5], preferably the latter, gives excellent end results and allows the patient to dress in a customary fashion and to walk with a normal gait.

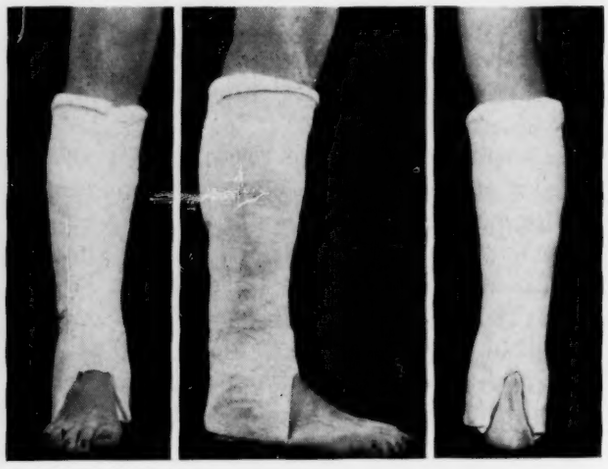

Fig. 5. A Delbet cast.

A Delbet cast is prepared of two heavy plaster splints placed laterally and medially on the leg and folding back on themselves for increased strength at the foot and malleolar areas. Felt pads are used over the malleoli and sides of the foot, and a circular felt pad is used about the top of the cast. The splints are wrapped on snugly by a circular bandage. After setting, the circular bandage is trimmed about the foot as in figure 5. This cast gives good lateral and medial stability at the subastragalar joint without interfering with flexion and extension of the ankle.

Conclusions

(1) Pott's fracture is a common fracture, which "is extremely troublesome to put to right, still more so to keep . . . in order."

(2) With the knee flexed and with strong traction applied, proper manipulation can produce anatomic reduction.

(3) Reduction, once secured, should be maintained with the ankle at an angle of 90 degrees or in slight plantar flexion and with the foot in a mid position between supination and pronation (the weight-bearing position).

(4) With adequate reduction and proper fixation, early weight bearing is not contraindicated.

(5) A Pott's fracture, when not properly reduced and so held, "gives infinite pain and trouble both to the patient and surgeon, and

5. Delbet, Pierre: Methode de Traitement des Fractures, Paris, F. Alcan, 1916.

very frequently ends in the lameness and disappointment of the former and the disgrace and concern of the latter."

Discussion

Dr. M. A. Pittman (Wilson): After reduction of a malleolar fracture (which we usually do under the fluoroscope with the knee and the foot at right angles) it has been our routine to apply a sugar-tong cast to the knee, then reinforce it and put a plaster boot or plaster cast to mid-thigh. I believe that better immobilization is provided with a cast above the knee for the first two weeks at least. At the end of two weeks this cast can be taken off and a cast to the knee applied. Under the fluoroscope, the malleoli can be better molded at that time. There is enough callus formation so that the fragments won't have a tendency to slip, and some of the swelling has subsided. At that stage of the game a pad and a walking splint, or the weight-bearing splint that has been described, is put on. We then leave this cast on six weeks. At the end of six weeks we remove the cast and put on an elastic stocking.

In my opinion it is just as important to treat the fracture the last six weeks as to reduce it in the first place. Without passive and active motion and some form of physiotherapy, ankylosis of the joint and stiffness of the knee will result. We have been using a simple method of heat therapy and exercise which some of you have probably heard of. After the first six weeks we have the patient buy a gallon or two of heavy cylinder oil and put this in a bucket. We have found that the skin will tolerate more heat from the cylinder oil than from water. At night, before retiring, the patient heats the oil to skin tolerance, and then puts his foot in the bucket. A rubber ball or sponge is also placed in the bucket, and the patient pedals that at least five hundred times, also using abduction and adduction. The heat appears to relieve the swelling, and I believe that this procedure does a lot of good.

The importance of sedentary hobbies—There is commonly no coincidence between the calendar age and the biologic age of an individual. There are many influences which determine this disparity, and among them are the forces of heredity, the manner of life and habits, temperament, the fortunes and misfortunes of human existence and the individual's ability to adapt himself to inevitables. It is a well-recognized fact that cardiovascular disease is remarkably prevalent among physicians, and it is almost a daily experience to witness a career suddenly and tragically interrupted or greatly modified by the unanticipated occurrence of this kind. Even when survival eventuates, the long convalescence and the prolonged period of limited rehabilitation frequently become a veritable nightmare.

There seems, then, to be little valid argument against the key premise of my thesis that physicians and others ought to embrace sedentary hobbies, relatively early in life. Potential hobbies are too numerous to mention, and must be selected primarily by the individual on the basis of interest and adaptability. Hobbies should be of a constructive nature, so that the satisfaction of accomplishment can be enjoyed. They should emphasize the use of the hands as well as the mind. A mind that is not constructively employed because of lack of interests soon retrogresses and causes decadence of spirit, morale and intelligence.—F. A. Willius, The Necessity and Importance of Adoption of Sedentary Hobbies, Proc. Staff Meet., Mayo Clinic 23:413 (Sept. 1) 1948.

CHANGES IN GASTRIC *pH* FOLLOWING THE ADMINISTRATION OF FRUIT JUICE TO PATIENTS WITH PEPTIC ULCER

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and

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WINSTON-SALEM

The general principles of the dietary treatment of peptic ulcer are well established. In 1935, Brown advocated a diet consisting of an increased number of feedings high in caloric value which are non-irritating, non-stimulating to acid secretions, and capable of combining with hydrochloric acid in considerable amounts. Ivy, in 1946, restated these principles and emphasized the importance of buffering the acid secretions of the stomach by frequent small feedings of a highly nutritious diet which would utilize the inhibitory action of fat on gastric secretions and emptying.

In practice, the application of these principles may be difficult. Patients often tire of the bland diet. The buffering effect on acid secretions may prove to be brief, and may be followed by an acid rebound. The injudicious use of a restricted, poorly balanced diet in the management of patients with peptic ulcer often results in varying degrees of malnutrition[1]. Many patients with peptic ulcer limit their diet voluntarily, even before being seen by a physician. They are particularly apt to omit citrus fruits and juices because of the fear that they will aggravate their symptoms. As a consequence, plasma levels of ascorbic acid in such patients have been found to be significantly lower than those in control patients of similar economic status but without peptic ulcer[2].

The general belief that fruit juices are "acid," and that they aggravate the symptoms of peptic ulcer unquestionably has limited their use. When they are given to amplify the diet of ulcer patients, they are often administered between meals as supplementary nutrition.

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1. Riggs, H. E., Reinholt, J. G., Boles, R. S., and Shore, P. S.: The Diet and Chronic Peptic Ulcer, J.A.M.A. 124: 639-641 (Mar. 4) 1944.
2. Crescenzo, V. M. and Cayer, D.: Plasma Vitamin C Levels in Patients with Peptic Ulcer, Gastroenterol. 8:754-761 (June) 1947.

In the following study the gastric response to fruit juice was compared with that obtained following the administration of milk.

Selection of Patients and Method of Study

Fifty-one patients on the medical service of the North Carolina Baptist Hospital were studied. They were divided into three groups as follows:

Group 1 (table 1) consisted of 19 patients with active peptic ulcers. Five of the patients were found to have gastritis, and 2 had advanced degrees of pyloric obstruction complicating their disease.

Group 2 (table 2) consisted of 14 patients without demonstrable organic gastrointestinal disease whose fasting gastric secretions contained free hydrochloric acid.

Group 3 (table 3) consisted of 18 patients without free hydrochloric acid in the fasting specimen. Only 4 patients had persistent achlorhydria following a test meal. Seven patients had organic gastrointestinal disease —pancreatic cancer, gastritis, lymphosarcoma, adenocarcinoma, or syphilis of the stomach.

The plan of study was the same for all patients. On the second or third day after admission a Levin tube was passed and the fasting gastric contents were aspirated. The tube was then removed and the patient was given a standard breakfast from which fruit juices and milk were excluded. A second aspiration was done two hours later, and the tube was left in place. One hundred and fifty cubic centimeters of freshly prepared, undiluted orange juice[3] were introduced into the stomach through the tube, and the gastric contents were aspirated as completely as possible thirty and sixty minutes later. Immediately following the sixty-minute aspiration, 150 cc. of whole milk[4] was given. Specimens were again withdrawn

3. Average pH—3.65.
4. Average pH—6.65.

Table 1

Group 1 (Peptic Ulcer)

				pH of Gastric Contents						
Case No.	*Age*	*Sex*	*Diagnosis*	*Fasting*	*2 Hours after Breakfast*	*½ Hour after Orange Juice*	*1 Hour after Orange Juice*	*½ Hour after Milk*	*1 Hour after Milk*	*Remarks*
1	44	M	Duodenal ulcer	1.69	1.70	1.60	1.51	2.85	1.63	
2	56	M	Duodenal ulcer	1.61	1.58	1.40	1.40	2.68	1.57	Discomfort after orange juice
3	39	M	Duodenal ulcer	1.70	1.70	1.53	1.50	2.37	1.90	Pain after orange juice
4	45	F	Duodenal ulcer		2.30	3.40	2.23	4.30	2.80	Discomfort after orange juice
5	30	M	Duodenal ulcer		1.80	3.20	1.55	3.70	1.69	Discomfort after orange juice
6	39	M	Duodenal ulcer	1.51	1.60	2.47	1.55	3.88	2.41	
7	43	M	Duodenal ulcer		1.99	2.72	1.71	4.35	1.93	
8	40	M	Duodenal ulcer	1.89	1.93	1.86	1.60	2.85	1.80	
9	37	M	Duodenal ulcer	6.60	1.78	1.70	1.72	2.38	1.85	Pain after orange juice. Mucus in fasting specimen
10	44	M	Duodenal ulcer with hemorrhage	3.40	1.60	3.27	1.77	2.10	1.52	Mucus in fasting specimen
11	26	M	Duodenal ulcer, pyloric stenosis	1.72	1.90	2.01	1.56	2.31	2.00	Discomfort after orange juice
12	55	M	Duodenal ulcer	1.97	1.53	2.21	1.49	2.18	2.34	
13	37	F	Duodenal ulcer	3.15	2.50	3.10	2.72	2.99	2.87	Mucus in fasting specimen
14	25	M	Duodenal ulcer	2.60		1.79	1.41	2.38	1.75	
15	56	M	Duodenal ulcer	2.55		1.48	1.40	4.11	1.43	
16	39	M	Gastric ulcer	2.38	2.20	2.40	1.67	3.68	3.42	
17	34	M	Prepyloric ulcer	4.86		3.29	1.63	5.29	1.72	Mucus in fasting specimen
18	31	M	Duodenal ulcer	6.80		3.91	2.20	4.40	2.57	Mucus in fasting specimen
19	60	M	Duodenal ulcer with obstruction	1.90	2.11	1.79	1.68	2.32	1.88	Pyrosis after orange juice
			Mean pH	**2.90**	**1.88**	**2.38**	**1.70**	**3.26**	**2.06**	

at thirty- and sixty-minute intervals. The volume of each gastric specimen was noted, the *p*H determined, and the free and total acidity titrated. It was found that the presence of weak organic acids and salts in fruit juice resulted in unreliable "free acid" end points when mixtures of fruit juice and gastric juice were titrated. Therefore, only the results of the *p*H determinations were used in the analysis of the basic data. The Beckman *p*H meter with glass electrodes was used in all the *p*H determinations. Duplicate determinations had a variation of less than ±0.02.

Results

Group 1

The average *p*H value of the fasting gastric specimens for the entire group of patients with peptic ulcer was 2.90. This relatively high figure was attributed to the presence of large amounts of mucus and an increased *p*H in the fasting specimens of 5 patients in this group. The *p*H for the remaining 14 patients, including 2 with pyloric obstruction, ranged from 2.60 to 1.51, the mean being 1.96.

Two hours after breakfast the average *p*H had fallen to 1.88 (chart 1). Following the administration of orange juice (table 4), slight buffering could be demonstrated at the end of thirty minutes in 9 cases (47 per cent). At the end of sixty minutes the *p*H of the gastric specimen had fallen below the fasting and after-breakfast levels in 17 patients (89 per cent).

Following the administration of milk a marked buffering effect was noted in 18 of the patients (94 per cent); at thirty minutes the average *p*H for the entire group was 3.26. At the end of one hour the average *p*H for the group was 2.06, and 11 of the patients (58 per cent) had *p*H values below their fasting levels. The mean figure of 2.06 however, was significantly higher than the

Table 2

Group 2 (Patients with free acid in fasting specimen and no organic gastrointestinal disease)

				*p*H *of the Gastric Contents*						
Case No.	*Age*	*Sex*	*Diagnosis*	*Fasting*	*2 Hours after Breakfast*	*½ Hour after Orange Juice*	*1 Hour after Orange Juice*	*½ Hour after Milk*	*1 Hour after Milk*	*Remarks*
1	46	F	Pelvic disease	2.15		2.09	1.72	2.88	2.68	
2	36	M	Neoplasm of brain stem	2.20	2.00	2.80	2.73	3.86	3.78	
3	42	F	Functional gastrointestinal disturbance	2.35	2.99	2.08	2.52	5.59	4.90	
4	63	F	Functional gastrointestinal disturbance	2.09	4.20	3.65	3.44	4.65	3.64	Burning after orange juice
5	44	M	Upper respiratory infection	2.42		2.37	1.60	3.45	2.20	
6	52	F	Functional gastrointestinal disturbance	2.10	2.19	2.04	1.80	3.40	3.00	
7	27	M	Essential hypertension	2.01	2.11	1.95	1.88	1.85	1.82	
8	45	F	Menopause	2.12	4.30	2.39	2.30	4.57	4.30	
9	28	M	Functional gastrointestinal disturbance	2.38	2.41	2.90	2.25	2.35	1.87	
10	38	M	Functional gastrointestinal disturbance	1.72	1.92	2.22	1.55	2.81	1.80	
11	54	F	Non-toxic nodular goiter	2.11	1.38	2.18	1.60	2.51	2.06	
12	28	F	Psychogenic vomiting	2.00		2.66	1.80	6.70	1.72	
13	28	M	Functional gastrointestinal disturbance	1.69	2.20	2.89	2.11	3.41	3.89	
14	38	F	Constitutional inadequacy	3.08		3.12	2.70	5.00	4.88	
			Mean pH	**2.17**	**2.57**	**2.52**	**2.14**	**3.79**	**3.04**	

Table 3

Group 3 (Patients with fasting achlorhydria)

Case, No.	Age	Sex	Diagnosis	pH of the Gastric Contents: Fasting	2 Hours after Breakfast	½ Hour after Orange Juice	1 Hour after Orange Juice	½ Hour after Milk	1 Hour after Milk	Remarks
1	37	M	Lymphosarcoma of stomach	8.32	7.60	4.07	2.29	5.87	4.29	
2	44	F	Urethral polyp	7.42		3.80	3.62	6.10	6.15	Achlorhydria
3	21	F	Gastrointestinal hemorrhage, site unknown	7.29		2.52	1.68	4.18	3.48	
4	32	F	Diabetes mellitus	5.93	3.58	3.59	3.31	4.95	4.32	Achlorhydria
5	34	M	Psychoneurosis	7.19	2.32	2.18	1.81	4.76	3.62	
6	44	F	Gastrointestinal neurosis	7.20	2.00	3.75	3.39	4.70	3.50	
7	61	M	Arteriosclerotic heart disease	7.31	2.69	3.25	2.25	4.15	1.95	
8	22	F	Rheumatoid arthritis	6.88	2.20	3.18	2.70	5.30	2.10	
9	49	M	Acute gastritis	7.61	7.90	4.28	7.01	7.04	7.78	Achlorhydria
10	26	M	Gastric resection	6.39		3.92	4.98	5.29	5.50	Achlorhydria
11	30	M	Gastritis (chronic)		6.50	2.70	2.60	6.70	4.40	
12	53	M	Carcinoma of pancreas	4.53	4.30	3.60	1.79	4.60	4.27	
13	52	M	Gastro-duodenitis	3.39	2.16	2.31	1.48	2.99	1.53	Pain after orange juice
14	30	M	Anxiety state	6.67	2.11	2.72	2.37	4.73	2.15	
15	40	M	Syphilis	3.42		2.60	2.10	3.20	1.85	
16	34	F	Syphilis	7.30		3.00	1.81	4.91	3.71	
17	29	M	Gastritis, chemical	6.90		3.10	1.96	4.18	2.31	
18	42	M	Carcinoma of stomach	3.48	3.66	2.90	2.84	3.38	3.02	
			Mean pH	**6.31**	**3.92**	**3.19**	**2.78**	**4.84**	**3.66**	

average *p*H one hour after the administration of orange juice.

Group 2

In this group of 14 patients without evidence of gastrointestinal disease, whose fasting specimens showed free hydrochloric acid, little change was noted in the *p*H values thirty minutes after the administration of orange juice. The mean for the group was 0.05 lower than the value before the orange juice was given. The stimulating effect of orange juice on the gastric secretions was more pronounced at the end of sixty minutes, at which time the mean *p*H for the group had fallen to 2.14, and 9 of the patients (64 per cent) had an increase in gastric acidity. Thirty minutes following the administration of milk the mean *p*H value for the group was 3.79; at the end of one hour this had fallen to 3.04.

Group 3

In this group of patients whose fasting gastric analysis showed no free hydrochloric acid, the initial *p*H of 6.31 fell to a mean of 3.92 two hours after breakfast. Thirty minutes after the administration of orange juice the mean value was 0.46 below the *p*H of the orange juice, and 0.73 below the mean of the previous specimens. After one hour 12 patients (67 per cent) had *p*H values below the fasting and after-breakfast levels. The mean of 2.78 for the entire group one hour after the administration of orange juice indicates a definite stimulating effect on gastric secretion.

Following the administration of milk, only 3 patients (17 per cent) had *p*H values below 4.00 at the end of half an hour. After one hour, 11 patients (61 per cent) still showed evidence of buffering of the gastric secretions. The mean *p*H values at thirty and sixty minutes were 4.84 and 3.66.

The *p*H values for all groups following the milk feeding were closely parallel.

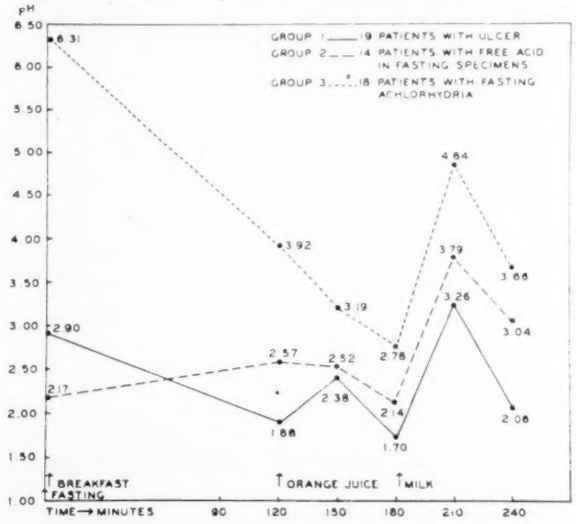
Statistical analysis[5]

The "T" test was used to judge the signi-

5. Statistical analyses were done by Paul R. David, Department of Medical Genetics, Bowman Gray School of Medicine.

CHART I

RESPONSE OF GASTRIC pH TO FEEDING OF ORANGE JUICE AND MILK



ficance of the differences between the *p*H values obtained one hour after the administration of orange juice and those found one hour after the milk feeding. In group 1 (patients with peptic ulcer) the value of "T" (4.18) for 18 degrees of freedom corresponds to a significance level of $P < .01$.

Similar analysis in group 2 (free acid controls) gave a "T" value of 3.34, which for 13 degrees of freedom is equal to a significance level of $P < .01$.

When the difference in mean *p*H values obtained immediately before and one hour after orange juice is compared with the difference in those obtained before and one hour after milk, the data are statistically significant, with a level of $P < .01$ for each of the three groups of patients.

Discussion

It is generally recognized that the use of a bland diet which is relatively non-stimulating, is of high buffering ability, and does not increase intestinal motility is a valuable adjunct in the medical management of peptic ulcer. The importance of providing the necessary dietary essentials to patients who are being maintained on therapeutic diets over considerable periods of time has been stressed by many clinical and laboratory studies. These have demonstrated that a deficiency of vitamin C is frequent in such patients. This appears to be due primarily to a reluctance on the part of both physician and patient to include in such diets citrus fruits, juices, and green vegetables, which provide the major sources of supply of this

Table 4

The Response of Gastric Acidity to Orange Juice and Milk at Thirty- and Sixty-Minute Intervals

		Orange Juice		*Milk*	
Group	*Time*	*Increased**	*Decreased***	*Increased**	*Decreased***
1. 19 ulcer patients	30 min.	9	10	1	18
	60 min.	17	2	11	8
2. 14 patients with free acid (no demonstrable lesions of gastrointestinal tract)	30 min.	5	9	2	12
	60 min.	9	5	4	10
3. 18 patients with fasting achlorhydria	30 min.	7	11	3	15
	60 min.	12	6	7	11

* Secretion of free acid and *p*H values below fasting levels or after-breakfast levels.
** *p*H values above fasting levels or after-breakfast levels.

vitamin. Eberhard[6] found that the exclusion of fruit juices from the diet was followed by distinct subjective relief in ulcer patients with hyperacidity and hypersecretion, and he supplied the vitamin-C requirements of such persons by the administration of oral ascorbic acid.

Claytor, Smith and Turner[7] reported that orange-juice test meals in a series of 20 patients had a stimulating effect on the gastric secretions, but they drew no conclusions concerning the place of fruit juices in the diet of patients with peptic ulcer.

Dimmler, Power and Alvarez[8] studied the effects of orange juice *in vitro* by mixing it with gastric juice obtained one hour after the Ewald test meal. They found that it "lowered high gastric acidities and raised low gastric acidities." When orange juice was given to two normal persons, no change was noted in the *p*H of the gastric specimens withdrawn after seventy-five and one hundred and fifty minutes.

Kugelmass[9] gave fruit juices to children and found that the *p*H of fractional aspirations taken at fifteen and thirty minutes corresponded to that of the fruit juice ingested.

Greenberg and Häggard[10] studied the effects of fruit juices and water on gastric

6. Eberhard, H. M.: A Comparison of the Ewald Test Meal and the Orange-Juice Test Meal, Rev. Gastroenterol. 10: 154-157 (May-June) 1943.
7. Claytor, F. W., Smith, W. L., and Turner, E. L.: Effect of Orange Juice on Gastric Acidity, Am. J. Digest. Dis. 8:43-44 (Feb.) 1941.
8. Dimmler, C., Jr., Power, M. H., and Alvarez, W. C.: Effect of Orange Juice on Gastric Acidity, Am. J. Digest. Dis. 5:86-87 (April) 1938.
9. Kugelmass, I. N.: Acid-Base Value and Assimilability of Fruit Juices, Am. J. Digest. Dis. 2:242-243 (June) 1935.
10. Haggard, H. W., and Greenberg, L. A.: Influence of Certain Fruit Juices on Gastric Function, Am. J. Digest. Dis. 8:163-170 (May) 1941.

acidity during active digestion in normal persons. They found that the addition of water or fruit juices to standardized meals made no appreciable difference in the *p*H of the gastric juice. The stimulating effect of fruit juices on the gastric secretions appears to be neutralized when they are given with other food.

These reports suggest that the gastric response following the administration of orange juice is variable. In the present study several points of interest were noted.

Response after fruit juice

As might be anticipated from the *p*H of the orange juice, buffering of gastric acidity was noted in 47 per cent of the patients studied. The fact that many patients complain of discomfort following the ingestion of citrus fruit juices alone, however, suggests that the buffering action of the fruit juice is of short duration. In 90 per cent of the ulcer patients, the orange juice had a stimulating effect on the gastric secretions, and at the end of one hour the *p*H values in these persons fell below fasting and after-breakfast levels. Additional tests with tomato juice in 2 ulcer patients produced the same response as did the orange juice, even though tomato juice has the highest *p*H of the commonly used juices.

While orange juice and tomato juice can not be relied upon to exert a buffering effect even for a brief duration, the stimulating effect of these juices on the gastric secretion is relatively constant. This effect can be modified if they are given with regular meals. Other methods for the administration of fruit juices have been suggested. Ehrman[11] advocated the addition of egg white or pectin powder to the orange juice, and the conversion of tomato juice into cream of tomato soup by the addition of light cream or milk. The *p*H of fruit juices (table 5) cannot be relied upon as a guide to their buffering effect. The buffering action of all juices, even tomato juice, is brief and inconstant, and they all have a subsequent stimulating effect on gastric acidity.

All of the thirty-minute gastric specimens were found to contain orange juice. At the end of sixty minutes none of the specimens showed visible evidence of orange juice except in those cases of peptic ulcer complicated by some degree of obstruction. The subjective response to orange juice was variable. Seven of the ulcer patients complained of epigastric discomfort, burning, or pain following its ingestion. The remaining 12 ulcer patients had no subjective complaints, although a marked increase in gastric acidity could be demonstrated following its administration in all except two.

Table 5

pH Values of Various Fruit Juices and Milk*

Fruit Juices	pH
Freshly prepared, undiluted	
Lemon	2.29
Grapefruit	3.12
Orange	3.75
Canned or bottled	
Grapefruit	2.98
Grape	3.00
Apple	3.24
Pineapple	3.42
Orange	3.62
Prune	3.70
Tomato	4.18
Whole Milk	6.65

* *p*H determinations were made on samples of various fruit juices and milk supplied to patients in the North Carolina Baptist Hospital.

Response after milk

Ninety-four per cent of the ulcer patients showed a decrease in gastric acidity thirty minutes following the administration of milk. At the end of one hour only 42 per cent of the group still showed evidence of buffering. The buffering action of milk was more prolonged than that of fruit juice, but was still relatively short. The difference between the findings after the administration of fruit juice and milk can not be attributed to an exhaustion phenomenon following repeated aspirations, since the secretion of gastric juice has been shown to be continuous in human beings. The fact that more than half the patients with ulcer showed an increase in gastric acidity at the end of one hour emphasized the necessity of using hourly feedings, particularly in the treatment of ambulatory ulcer patients who fail to respond satisfactorily to the usual six-meal regimen.

None of the patients with ulcer had any subjective discomfort following the administration of milk, even when the nature of the ingested substances was not made known. The finding of milk in nearly all sixty-minute specimens indicated that milk is more effective than fruit juice in decreasing gastric motility.

Application to therapy

It would appear that frequent between-

11. Ehrmann, Rudolf: Therapeutic Aspects of Peptic Ulcer, Rev. Gastroenterol. 14:89-98 (Feb.) 1947.

meal feedings of carefully selected foods are important in combatting the ability of the stomach to produce highly acid secretions when peptic ulcer is present. The *p*H curves obtained after the milk feedings paralleled one another in all groups of patients and varied only in the intensity of the response. After the administration of orange juice, patients with ulcer showed a greater increase in acidity than did the other patients studied. Apparently the stimulating effect of the orange juice on the gastric secretions is intensified in patients with peptic ulcer. This response, as well as the indirect evidence of increased motility, may in part explain the subjective symptoms of many of these patients following the ingestion of fruit juices.

Conclusions

1. The buffering effect of orange and tomato juice on gastric acidity is brief and declines rapidly thirty minutes after ingestion. A stimulating effect was almost invariably noted in the next thirty-minute period.
2. One hour following the administration of orange juice, mean *p*H levels of the gastric contents were found to be below both fasting and after-breakfast values.
3. The buffering effect of milk on gastric acidity, although of longer duration than that of fruit juice, may have to be maintained by frequent feedings.
4. When orange juice or other fruit juices are added to the diet of patients with peptic ulcer, they should be given with regular meals or in combination with other foods.

Dangerous drugs.—It is unfortunate that some vendors of vitamin D have gone out of their way trying to convince physicians that the use of the drug in huge doses is perfectly safe. Certainly any physician who has ever seen a few cases of serious injury due to the use of vitamin D will not subscribe to that statement.

It is unfortunate, but throughout the long history of medicine, one finds that physicians have always had so much pressure put upon them to do something for the person who is desperate because of the persistence of some disabling disease that always they have used in large quantities drugs the usefulness of which has never been demonstrated. Today any physician past sixty years of age can remember the time when everyone with a cough or with tuberculosis had his or her digestion ruined with large doses of creosote which was supposed to kill the offending bacteria, but didn't.

Doubtless, physicians will always be high-pressured into giving drugs whose usefulness has never been demonstrated scientifically, but in that case the wise man who does not want to do harm will prescribe small doses.—Walter C. Alvarez: The Danger of Giving Large Amounts of Vitamin D, Gastroenterology 11:136 (July) 1948.

PRESENT TRENDS IN LABORATORY PROCEDURES

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Sometimes we can best tell where we are going by looking at the places where we have been. This is a hazardous habit if we are travelling at a high rate of speed; but if we stop for a moment, a look backward may reveal some landmarks which will help us to go forward with some assurance that we will make genuine progress. When we consider recent trends in laboratory procedure, we are almost compelled to stop and ponder on the procedures of the past; for many of our present-day activities and those of the predictable future are merely adaptations of old, tried and true methods or improvements of tests which have been tried and abandoned, only to be revived when a new antigen, medium, drug, chemical or instrument is added to our list of facilities.

Examination of Water

If we look backward, we find that the sanitary examination of water is a historical landmark for public health laboratories in North Carolina. The General Assembly in 1907 established the State Laboratory of Hygiene, made an appropriation of $2,000, and supplemented this appropriation with a schedule of fees which the laboratory should charge for the examination of specimens from all concerns which sold water in the state. Thus was established an activity and the precedent that financially the State Laboratory of Hygiene must be partially self-supporting. Each year since then this laboratory has been expected to take in receipts equal to one third to one half of its total operating expenses.

The objective of our sanitary examination of water is essentially the same today as it was forty years ago. Today we have better equipment, better media, better methods, and higher standards. We are now making complete chemical analyses, primarily for the purpose of establishing more effective treatment plants or operating equipment more efficiently, but also to aid industry in choos-

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Read before the Section on Public Health and Education, Medical Society of the State of North Carolina, Pinehurst, May 4, 1948.

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ing locations where suitable water is available. A new aspect of the water supply problem is looming large upon the horizon—the so-called trace elements. A few years ago we regarded the presence of fluorides as undesirable; today a certain concentration of fluorine is considered so advisable that some communities are adding fluorides to their drinking water in the expectation that those who drink it will have fewer decayed teeth. Perhaps sometime in the future traces of copper, boron, or some other element will be considered as an essential ingredient of drinking water.

Serologic Tests for Syphilis

From the standpoint of volume of work, serologic tests for syphilis are important. Probably more effort has been exerted to improve these procedures than for any other laboratory test. We have a multiplicity of tests, or rather techniques, bearing the name of the author serologist, each of whom claims that his procedure would find more syphilis and never be falsely positive. While much has been done to improve sensitivity, it is the lack of specificity which continues to worry laboratory directors. False positives frequently place the stigma of syphilis on people who do not have, and have not had, the disease. The most recent hope is the cardiolipin antigen. It is apparent, however, that the false positive test has still not been eliminated.

The quantitative serologic test for syphilis is one example of a procedure which has waxed and waned in favor. At the moment it is highly regarded by most syphilographers and is considered an indicator of the effectiveness of rapid-treatment methods. Its value for this purpose, as well as the value of rapid treatments themselves, can only be determined with the passing of the years. At the State Laboratory of Hygiene we are now making quantitative tests for physicians who are giving penicillin to their patients and for those who are trying to detect congenital syphilis in infants. Doctors who are responsible for patients who have been treated in either the Western or Eastern Medical Centers should continue to send specimens from these patients to the Centers, and not to the State Laboratory of Hygiene.

Complement Fixation Tests

When we became aware of the widespread distribution of virus infections, most of us thought in terms of virus laboratories for the isolation and identification of the viruses themselves. The cost of setting up such laboratories and the scarcity of well trained virologists kept most of us from embarking on this venture. Now it seems that serologic studies, particularly the complement fixation test, will supply us with the essential information needed to give laboratory aid to the clinician or epidemiologist. Several years ago, you will recall, complement fixation was pretty well discredited as a laboratory test for diseases other than syphilis. Now we have antigens which will help identify specific virus infections. Progress in this field is so rapid that in a few months or years dependable antigens for a considerable number of viral as well as rickettsial infections will be commercially available. Even for such conditions as amebic dysentery and trichinosis complement fixation offers hope of giving cheap and dependable laboratory aids in diagnosis. In our own laboratory complement fixation tests for endemic typhus and Rocky Mountain spotted fever apparently become positive almost as rapidly as the Weil-Felix test and are type specific.

Microscopic Examinations

When we pause to consider those laboratory examinations which are made chiefly by the microscope, we think automatically of the old fashioned or conventional Board of Health Laboratory procedures such as examinations of the sputum for tuberculosis, of a throat culture for diphtheria, of blood films for malaria, of animal heads for rabies, of urethral smears for gonorrhea, of feces for intestinal parasites, of spinal fluid for meningitis, and of chancre serum for syphilis. Some of the methods in use years ago were so satisfactory that, although new methods have been brought forward and tried, the old ways held on against modern competition.

For tuberculosis we still depend to a large extent upon the microscopic examination for typical acid-fast organisms, and upon guinea pig inoculation. There is an increasing use of cultural methods to reveal tubercle bacilli in specimens which have so few organisms that careful search under the microscope fails to show them. Cultural methods will yield positive findings sooner than animal inoculation, and at a fraction of the cost. Up to the present time, however, there is no indication for abandoning either microscopic examination or animal inoculation, for each

method has its own field of usefulness.

Gonococcus culture has a definite field of usefulness, particularly for the diagnosis of chronic gonorrhea and for determining the effectiveness of treatment.

We consider that it is good policy to inoculate mice with brain substance when microscopic examination fails to reveal typical Negri bodies in the brain cells of animals suspected of having rabies.

A new microscopic procedure which has aroused much interest is the examination of vaginal and cervical smears as an aid in the early diagnosis of cancer of the uterus. The study which Dr. Kernodle and Dr. Cuyler have made at Duke Hospital[1] has proved so valuable that we expect to set up a Cytology Service at the State Laboratory of Hygiene and make this service available to the physicians of North Carolina. It is hoped that some adaptation of this method may be useful for cancer of the urinary tract, of the lungs, and perhaps of the gastrointestinal tract. Other tests for cancer which may be found useful in the public health laboratory are now being evaluated, but critical appraisal may show them to be useless.

Before leaving the subject of examinations that are principally microscopic in nature, we should emphasize the fact that the so-called tropical diseases are likely to become a serious threat to the health of our people. We must be alert to think of them and to look for them. North Carolina is fortunate in having in its medical and public health schools men who are experts in tropical medicine. Our laboratory service should benefit from their advice and counsel.

Bacterial Culture

Bacterial culture is an increasingly important laboratory aid to diagnosis. For those diseases which have organisms circulating in the blood stream, blood culture is most helpful. Better mailing containers will increase the usefulness of cultural methods for those specimens which can be sent through the mail. For cultures which are difficult to identify, such as types of Salmonella, there are available competent reference laboratories with which arrangements have been made for study and accurate typing.

1. (a) Kernodle, J. R., Cuyler, W. K., and Thomas, W. L.: The Use of Vaginal Smears in the Diagnosis of Genital Cancer, North Carolina M. J. 9:11-17 (Jan.) 1948. (b) Kernodle, J. R. and Cuyler, W. K.: Report of a 14-Month Study on the Use of Vaginal and Cervical Smears in the Diagnosis of Malignancy, Ibid 9:325-341 (July) 1948.

Preparation of Biologic Products

The general trend in the preparation of biologic products is for more emphasis to be placed on potency and toxicity tests, while still holding to the usual sterility and safety tests. The desire to increase the concentration of the antigenic content of products used for immunization has followed the improvement in the purity of those used for the treatment of disease. For immunization there is an increasing demand for products containing more than one antigen. Pertussis vaccine has been combined with diphtheria toxoid, alum precipitated, and diphtheria and tetanus toxoids have been combined. There is ample evidence that effective immunity is produced by each antigen when multiple antigens are used. So far there has been little demand for any product containing more than two antigenic agents.

In the case of pertussis, deaths occur most frequently in infants under 4 months of age. If we are to give protection to those who need it most, pertussis vaccine should be given to infants during the first two or three months of life, a period when effective immunization against diphtheria is not produced. If very young infants are given pertussis vaccine, their immunity to whooping cough can be boosted by giving them pertussis vaccine combined with alum precipitated diphtheria toxoid at 6 to 9 months of age. For typhoid vaccine the recommendation holds that initial immunization should be obtained by three doses given subcutaneously. The Army now recommends that each of the three doses be ½ cc. Booster doses each year thereafter should be given intracutaneously.

Much progress has been made in the study of plasma fractions, the most familiar one being immune globulin, which has changed the methods for the management of measles epidemics. Serum albumin is particularly helpful in shock, and more dependable blood typing can be obtained by plasma fractions. In fact, the blood bank program of the future will be quite different from that of the past.

The Laboratory of the Future

Now what about the laboratory of the future? In North Carolina we are pretty well committed to the development of local laboratories, rather than the establishment of branch state laboratories. There are, of course, certain advantages as well as certain

objections to each type of program. Perhaps the fundamental decision should be based upon whether or not we believe in local self government or in a strong state or national plan of administration. Another important factor to be considered is that many laboratory examinations can best be made near the source of the specimen.

To my mind another important reason for having local laboratory service is that a system of local laboratories gives a broad base of financial support; thus the state as a whole is assured of a more consistent type of service than is possible when the whim of a single budget officer or appropriating body can cause the quality of service to decrease or increase over a wide area. It is true, of course, that any one local laboratory may be dependent upon the decision of a local budget officer or appropriating body, but the service in the state as a whole should be more stable with locally operated laboratories than with the state or national system.

Since the enactment of the state marriage law, we have developed a system of approved local laboratories for the making of serologic tests for syphilis. There are now more than 100 of these approved laboratories in the state.

Plans have been made for the establishment of regional milk laboratories. Just what the Milk Commission and the General Assembly will provide in the way of a milk program only time can tell. We have seen 5- to 10-cow dairies replacing the 50-cow dairy. The question arises: Can the Board of Health make ten times the number of dairy inspections, or must we depend more and more upon the laboratory to find out the kind of milk produced in North Carolina?

We would like to see a laboratory as a part of each local health department and are of the opinion that we should plan to bring that service about as rapidly as possible. The Medical Care Program will unquestionably accelerate the development of local laboratories. It is hoped that the public health program may be closely integrated with the Medical Care Program. In a great many localities one laboratory can provide service for both the Medical Care Program and the local health department.

If present trends are not deceiving, the future reveals a vastly increased laboratory service extending into every nook and corner of the state. It will profit us little to have well planned quarters, well placed laboratory furniture, and excellent equipment if we do not have well trained laboratory workers. In the past a technician should be taught to follow specific directions; now we need workers who not only know "how" but "why." The future laboratory worker should have good academic training in fundamental sciences, particularly chemistry, physics, and bacteriology. The most logical sources for these well trained workers are the colleges of North Carolina. Our leaders should confer with educational authorities in an effort to see that adequate preliminary training is offered to our college students. It is also important that provision be made for college graduates to secure experience in well regulated laboratories. We feel confident that the laboratory will be increasingly helpful in the health program.

Discussion

Dr. W. P. Richardson (Raleigh): Dr. Hamilton has given us a most interesting discussion of the present status and future prospects of many public health laboratory procedures.

There are two aspects of adequate laboratory service: One is the responsibility of the laboratory workers who actually do the tests, and the other—and I think this is equally important—is the responsibility of those who take the specimens on which the tests are performed. The results of any laboratory tests are dependent upon the specimens on which they are performed.

I hear a great many complaints from laboratories about hemolyzed blood specimens that are sent in for serologic tests for syphilis. It is important that we take all the precautions with which most of us are familiar to see that these specimens are properly taken and refrigerated until they are mailed.

We also have a responsibility not to ask for tests which we know are worthless—for instance, the examination of vaginal or urethral smears for the diagnosis of gonorrhea in the female. Culture is the only accurate method of making a specific diagnosis in a female.

Dr. Hamilton referred to the desirability of cooperation between the public health agencies and medical care programs. An increasing number of local hospitals and medical centers are being planned over the state. Many of these are in communities where the health departments, probably for many years to come, will have neither the volume of work nor the financial support to justify a health department laboratory. I think it is important that cooperative relationships be established between these centers and local public health agencies, both in laboratory work and in other fields.

Dr. Hamilton also referred to the matter of better training for laboratory workers. In a hospital, the presumption is that laboratory workers are under the supervision of a competent clinical pathologist. Few of us in local health departments would feel competent to give that type of supervision to our laboratory workers, and we must have workers who have the training and ability to carry on and do an effective job with the very limited amount of supervision which can be provided from the central laboratory.

Dr. E. W. Furgurson (Plymouth): I want to ask Dr. Hamilton when we can anticipate a negative Wassermann or Kahn test in patients who have been treated at the rapid treatment centers.

I also want to ask him what type of laboratory and x-ray facilities might be needed in a hospital of 30 to 50 beds, such as the Medical Care Commission is advocating for smaller communities. This is an important question with us. We don't want to put a millstone around the necks of the people by asking them to support a hospital on too large a scale.

In my community, about 47 per cent of the population is colored, and that means that it is going to be a terrific burden for those people to support a county hospital even after they have paid the initial cost.

Dr. Hamilton: Dr. Wright can answer Dr. Furgurson's first question more satisfactorily than I can because I think it has been asked him more often. So far as Dr. Furgurson's second question is concerned, I want somebody to volunteer to answer that. I can only give advice about what **not** to do. Don't place a laboratory down in the basement or up in the attic and give it closet space. Make provision for two laboratory technicians to work without bumping into each other. The laboratory should be provided with a location that gives it a little dignity, and comfort and convenience certainly should receive primary consideration.

Dr. John L. Wright (Director, Field Epidemiology Study of Syphilis, Chapel Hill): Syphilis serology following intensive treatment parallels almost the course of serology following the old methods. If the blood test doesn't revert to negative within a year, treatment is usually considered a failure.

Dr. H. C. Lennon (Greensboro): Until recently, North Carolina has supported very few, if any, pathologists except those connected with the medical schools. Within the past few years, more private pathologists have come into the state, and we hope that we are contributing a little to the raising of medical standards in the state. After hearing all these elaborate plans for laboratory services to be distributed by the state, I wonder whether there will still be room for private pathologists or whether the state is planning to establish laboratories all over the state in competition with the private pathologists. We, as pathologists, would like to know whether laboratory medicine is going to be taken over as state medicine.

Dr. Hamilton: I can't make any prediction specifically about the future. Primarily, it is our purpose to encourage the development of local laboratories rather than to establish branch laboratories. The policy that we are following, to all intents and purposes, is the program of New York State. I don't think we are ever likely to have enough money available to the public health program for us to establish state laboratories in each county in the state. I, personally, have no desire to have state medicine or socialized medicine including laboratory procedures.

We must suspect malignancy or a premalignant character in all gastric ulcers first appearing after the age of 40; in all those in the prepyloric inch, and in other parts of the stomach that are not on or adjacent to the lesser curvature; in those exceeding an inch in diameter; in those that do not heal after a month's strict medical treatment in bed and in which occult blood is still found in the stools after such treatment. All these should be submitted to surgery without further delay.—Ogilvie, H.: The Early Diagnosis of Cancer of the Oesophagus and Stomach, British M. J. 2:407 (Sept. 13) 1947.

FIBROMYOMA OF THE CERVIX

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The subject of uterine tumors, particularly fibromyomas, has been dealt with quite adequately by most writers on gynecologic subjects, but fibromyomas of the cervix have received little attention in the American literature, although foreign authors have written about the condition frequently. Most textbooks consider the subject as a subdivision of uterine fibroids, although Beecham[1] admits that the picture presented is often that of a purely cervical tumor.

Case Reports

Case 1

A 20-year-old white woman was admitted to Flushing Hospital on January 29, 1948, with the complaint of vaginal hemorrhage. The bleeding had been spontaneous, and a diagnosis of inevitable abortion had been made by the family physician, who packed the vagina with gauze, and immediately sent the patient to the hospital.

Her past history was irrelevant. The menarche was at the age of 12, and her periods were regular, occurring every twenty-eight days and lasting four to five days. She had been married in 1944, at the age of 17. She became pregnant a short time later, and after an uneventful pregnancy was delivered of a living child on December 22, 1945. Since that time her menstrual periods had been normal; the last period began on January 10, 1948, and lasted five days.

Examination on admission revealed a well-developed, well-nourished young white woman in no apparent distress. General physical examination was essentially negative. The blood pressure was 120 systolic, 80 diastolic.

Blood examination showed 4,330,000 red blood cells, 86 per cent hemoglobin, and 17,800 white blood cells, with 91 per cent polymorphonuclears and 9 per cent lymphocytes. Her blood group was O, and she was Rh-positive. Urinalysis was negative, and the Aschheim-Zondek test for pregnancy was negative.

On pelvic examination, a mass about the size of a two to three months' pregnancy was felt in the upper part of the vagina. The cervix was greatly dilated and stretched thinly over the mass. The fundus could not be definitely outlined. Through the speculum the mass could be seen, partially protruding from the cervix; it was grayish white in color, with a vein coursing across the surface. A tentative diagnosis of uterine polyp, possibly with some inversion of the uterus, was made.

Since the patient was somewhat uncooperative, she was examined under anesthesia. Preparations were made to remove the mass by either the vaginal or the abdominal route, depending on its location and extent. The mass was found to be entirely in the cervix, lying in the anterior lip with the cervical canal appearing as a slit posterior to it. The fundus could be felt above the dilated cervix. Because all

Read before the North Carolina Obstetrical and Gynecological Society, Mid Pines, April 18, 1948.

1. Beecham, C. T.: Nonmalignant Diseases of the Cervix, S. Clin. North America 25:1299-1305 (Dec.) 1945.

of the tissue was distorted, an incision was made over the posterior aspect of the mass, and, with little difficulty and little bleeding, the entire mass was shelled out. The remaining anterior lip was very thin, with much redundant tissue. The anterior mucosa was incised and stripped back, and the excess cervical tissue removed. The cervix was repaired by several deep sutures, and the mucosa replaced with three Sturmdorf sutures.

The postoperative course was uneventful, and the patient left the hospital on the fifth postoperative day. The cervix healed satisfactorily, and now looks like a normal multiparous cervix with no atresia of the canal.

The pathologic report on the specimen removed was as follows:

"**Gross:** The growth was a well encapsulated mass 90 by 65 by 60 mm. The surface was smooth and pale grayish-tan in color. On section it consisted of grayish-white tissue, arranged in whorls. One area had a focal hemorrhage measuring 1 mm. in diameter.

"**Microscopic:** The mass consisted of fibrous tissue and smooth muscle bundles, having a characteristic interlaced appearance."

The pathologic diagnosis was "Fibromyoma."

Case 2

A white woman, aged 39, was admitted to Flushing Hospital on April 4, 1948, complaining of a mass protruding from the cervix. She thought that it was a recurrence of a cystocele which had been repaired previously.

She had been married eleven years, and prior to her marriage she had been in good health. The menarche was at the age of 14, and her periods occurred every twenty-eight days, lasting three to four days. She had dysmenorrhea on the first day only. Her first pregnancy in 1938 was uneventful, a full-term baby being delivered by forceps. She was left with a marked cystocele and rectocele, which was repaired in 1939. In 1944 an ectopic pregnancy was interrupted and the right tube and ovary were removed. In 1945 she had a full-term pregnancy which was terminated by cesarean section. During the last pregnancy she had noticed a slight protrusion from the vagina, but since it did not inconvenience her, she did not consult a physician. In the past year, however, it had been growing larger and appearing at the vaginal outlet as a small mass. She experienced no pressure symptoms.

Examination revealed a well developed, well nourished white female, in no apparent distress. Her general physical condition was good. The blood pressure was 128 systolic, 82 diastolic. Blood count and urinalysis were normal. Pelvic examination revealed a normal sized uterus, in good position. The adnexa were normal. The cervix was normal in size, and the mucosa showed the scar of the colporrhaphy which had been done nine years previously. From the anterior lip of the cervix, there was an elongated mass, attached by a pedicle.

At operation, the mucosa was incised and stripped back for a short distance. A clamp was placed on the pedicle and the tumor removed. Bleeding was controlled with a transfixion suture, and the mucosa closed with interrupted sutures. The postoperative course was uneventful.

The pathologist's report was as follows:

"**Gross:** Mass 40 mm. in length and 30 mm. in diameter, completely covered by epithelium. On section it was pinkish white with tissue arranged in whorls.

"**Microscopic:** Fibrous tissue and muscle tissue interlaced.

"**Diagnosis:** Fibromyoma."

Incidence

At the present time, it is estimated that cervical fibromyomas occur in about 5 per cent of all cases of uterine fibromyomas. Since the incidence of uterine tumors which cause symptoms has been estimated by Lynch to be less than 8 per cent of gynecologic admissions to hospitals, the incidence of cervical fibromyomas on gynecologic services is about one fourth of 1 per cent. In 1930 Turenin[2] reviewed the literature, and found 112 cases. Douay[3], in 1939, found 120 cases. Since that time, cases have reported from Argentina[4], Brazil[5], Austria[6], Italy[7], Belgium[8], and from this country. Greenhill[9] presented 3 cases in 1936, and in 1940 Dockerty and Masson of the Mayo Clinic reported a case which also showed squamous-celled carcinoma[10]. Torpin and Beard[11] presented a case in 1940, and in this article classified these tumors according to the location on the cervix from which they arose. In 1943 Torpin[12] reported another case, in which the tumor had obstructed labor.

Classification

Torpin's classification is as follows:

A. Tumors arising from the upper part of the cervix and growing upward to the abdominal cavity, elevating the fundus.

B. Tumors arising from the middle portion of the cervix and extending laterally into the intraligamentous area, anteriorly under the bladder, or posteriorly into the tissues between the vagina and peritoneum.

C. Tumors which arise from the portio vaginalis and remain in the vaginal canal or protrude from it.

D. Tumors which arise from the stump after supracervical hysterectomy.

2. Turenin, quoted by Counsellor and Collins: Fibromyoma of the Cervix Uteri; Report of a Case, Am. J. Obst. & Gynec. 30:108-112 (July) 1935.
3. Douay, quoted by Bourg and Hannes(8).
4. (a) Boveri, J. L. and Belizan, L. A.: Fibromal de cuello uterino, Rev. Assoc. méd. argent. 60:297-299 (May 15) 1946. (b) Mainetti, J. M. and Triaca, J. A.: Fibromioma de la porcion intravaginal del cuello uterino, Rev. med. d' Hosp. ital. de La Plata 2:39-51 (July-Dec.) 1945.
5. (a) Silva, Castro in Rev. de gynec. e. d'obst. 1:343, 1938. (b) Cavalcanti, R.: Cervical Myoma with Report of a Case, Rev. med. de Pernambuco 13:158, 1943.
6. Matolcsy, K.: Vaginale Enukleation eines cervicalen Myomherdes unter der Geburt, Zentralbl. f. Gynäk, 66: 2006-2008 (Dec. 12) 1942.
7. Micca, A. B. in La Ginecologia 16:873, 1937.
8. Bourg and Hannes: Contribution a l'etude du fibromyome du col utérin, Bruxelles-med. 27:577-583 (March 16) 1947.
9. Greenhill, J. P.: Fibromyoma of Cervix Uteri; Three Cases, One Developing in Stump after Hysterectomy, Am. J. Obst. & Gynec. 31:678-680 (April) 1936.
10. Dockerty, M. B. and Masson, J. C.: Unusual Coexistence of Squamous Cell Carcinoma and Cervical Fibromyoma, Am. J. Obst. & Gynec. 40:477-481 (Sept.) 1940.
11. Torpin, R. and Beard, B. C.: Fibromyoma of the Uterine Cervix, Pedunculated and Expelled from the Vagina, Am. J. Obst. & Gynec. 40:490-492 (Sept.) 1940.
12. Torpin, R.: Fibromyoma of the Cervix Uteri Obstructing Labor, West. J. Surg. 51:196-198 (May) 1943.

Complications

The importance of these tumors lies in their proximity to important pelvic structures such as the bladder, urethra, ureters, and rectum. The tumor can also complicate labor if it occurs in the lower part of the cervix, although Beck[13] feels that in most cases the tumor moves upward as the cervix dilates and does not cause dystocia. The most important symptom reported is that of sudden, painless, and often uncontrollable vaginal hemorrhage, due to necrosis and erosion of the blood vessels.

These tumors are usually fast growing, probably because of their abundant blood supply. The commonest location[14] is on the posterior lip of the cervix, and if a large tumor is so located[15], it may compress the rectum or give a feeling of weight in the pelvis. Probably many of these tumors are removed in cases of multiple fibromyomas of the uterus, with no notice being taken of the fact that the tumor mass which fills the cul-de-sac had its origin in the cervix.

These tumors may also arise from the anterior lip and give urinary symptoms by compressing the bladder or urethra or both. If the tumor arises from the lateral aspect of the cervix, it will extend between the leaves of the broad ligament and compress the ureter, or become so involved with the ureter that it is difficult to separate it at operation.

Thus it can be seen that this tumor, which is in itself benign, can be an extremely dangerous one, and that it should be removed as soon as discovered.

Methods of Removal

The method of removal depends on the location of the tumor, as well as on the age of the patient[14]. In patients of the child-bearing age, myomectomy is the method of choice, but in older patients, particularly those past the menopause, total hysterectomy should be performed[16]. Pedunculated growths can be removed by clamping the pedicle. Interstitial tumors which are entirely vaginal in extent may be removed by vaginal myomectomy; one should first be sure, however, that the entire mass can be reached from the vagina, so that the bleeding can be controlled from below. One must also define the bladder, for the mass often distorts the tissues to such an extent that normal vaginal landmarks are not located. Any tumor growing from the upper part of the cervix requires an abdominal operation. Victor Bonney[17] favors this approach in all fibromyomas of the cervix. He feels that myomectomy, if it is necessary to preserve the uterus, can be more safely performed when one has the major blood vessels in an easily accessible position.

Conclusion

I have presented 2 cases of fibromyoma of the cervix, a comparatively rare tumor which can give rise to very serious complications. The patient (aged 20) in the first case presented is believed to be the youngest in which this tumor has been found. Most cervical fibromyomas have been found after or near the menopause, and very few cases have been reported in patients under the age of 35.

147-05 Roosevelt Ave.

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14. Dannreuther, W. T.: Treatment of the Fibroid Uterus, in Meigs, J. V. and Sturgis, S. H.: Progress in Gynecology, New York, Grune & Stratton, 1946.
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16. (a) Crossen, H. S. and Crossen, R. J.: Operative Gynecology, ed. 6, St. Louis, C. V. Mosby, 1948. (b) Te Linde, R. W.: Operative Gynecology, Philadelphia, J. B. Lippincott, 1946.
17. Berkeley, C. and Bonney, V.: A Textbook of Gynaecological Surgery, ed. 4, London, Paul B. Hoeber, 1942.

Definition of a psychoneurosis.—A psychoneurosis is a group of symptoms which may be physical, mental, or both, which develop in an individual when he is incapable of dealing successfully with the circumstances in his life at a given time. His powers of adaptability are inadequate in the face of the complexities of the present situation. There are two implications in this definition of which I hope you will make note: first, that neuroses occur in response to demands made upon the individual. These demands may come from without or from within the person. Secondly, observe that this definition implies that recovery from a neurosis is possible. Improvement may be brought about either by reduction of the demands upon the individual or by the acquisition of additional knowledge and understanding, by which his ability to adjust or cope with the situation is improved. The former method is exemplified by the regimen which requires a long rest "getting away from it all," or some other procedure which masks the situation or otherwise diminishes the pressure. The latter method is best illustrated by a program of psychotherapy which increases the person's adaptive powers.—Samuel B. Hadden: The Genesis of the Neuroses, Ann. Int. Med. 27:282 (Aug.) 1947.

IN VITRO OBSERVATIONS ON THE ANTIBACTERIAL ACTIVITY OF AUREOMYCIN

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Preliminary clinical and laboratory investigations of a new antibiotic, aureomycin, indicate that this agent has a high degree of chemotherapeutic activity against rickettsias and the larger viruses (the lymphogranuloma venereum and psittacosis group) in addition to many of the common gram-negative and gram-positive bacteria. Aureomycin is a drug of low toxicity and may be administered by either the oral or the intramuscular route[1]. Before this antibiotic can be employed most effectively, practical laboratory methods for its assay must be developed, its pharmacologic properties must be defined, and its activity must be compared with that of the antibacterial agents now in clinical use.

The following *in vitro* study on aureomycin was undertaken in connection with a clinical trial of this antibiotic in the treatment of Rocky Mountain spotted fever[2]. A practical laboratory procedure was developed for assaying aureomycin in serum and for studying several of the pharmacologic properties of this drug that are important in its clinical usage. The susceptibility of some of the common bacterial pathogens to aureomycin was investigated and was compared with their susceptibility to streptomycin and penicillin. As secondary bacterial complications frequently occur during the course of viral or rickettsial infections, a knowledge of the spectrum of antibacterial action exhibited by aureomycin is essential to its proper use in these diseases. This information will aid in deciding whether another chemotherapeutic agent should be given to prevent superimposed bacterial infections, or whether adequate prophylaxis may be expected from aureomycin alone.

Methods

Method for testing the sensitivity of bacteria to aureomycin

The aureomycin used in this study was the crystalline hydrochloride salt, a purified product of Streptomyces aureofaciens[3]. The antibiotic was stored at room temperature in the desiccated or lyophilized form. The latter was soluble, in concentrations of 10 mg. per cubic centimeter, in twentieth molar phosphate buffer, physiologic saline, or distilled water; the desiccated powder was soluble in these diluents in concentrations through 0.1 mg. per cubic centimeter. Solutions of this antibiotic were made just prior to a test and, when necessary, were sterilized by Seitz filtration.

In vitro measurements of the sensitivity of various bacteria to aureomycin were obtained by a serial dilution method. Five tenths cubic centimeter of a diluted six-hour culture of the organism in tryptose phosphate broth (Difco) was added to each of several 0.5 cc. samples of serial dilutions of the antibiotic, previously made in master tubes of the nutrient broth. If too large a bacterial inoculum was employed, the results of the test were of little practical value. A ten thousand fold culture dilution (10^{-4}) was used for the gram-negative bacilli tested, and a thousandfold dilution (10^{-3}) for the gram-positive cocci. The size of an individual inoculum was determined by viable pour plate counts in solid media. Observations were made after 18 hours of incubation at 37 C., and the end point was taken as the first tube in a series of drug dilutions that showed no growth as measured by turbidity; the drug concentration per cubic centimeter in this tube was recorded as the sensitivity of the test inoculum used.

It should be emphasized that all of the tests used to measure the sensitivity of bacteria to chemotherapeutic agents, including the method used in this study, require a long period of incubation before end points are recorded. The aureomycin sensitivities obtained by these methods could be subject to error because of drug inactivation. In view of this possibility, attempts were made to develop a sensitivity test based on the principles of the rapid turbidimetric method used to measure aureomycin levels. Failure to develop a simple procedure and difficulty in the interpretation of results have so far made such a test impractical.

Methods for measuring aureomycin levels

The activity of aureomycin in solution was measured against a reference strain of **Staphylococcus aureus**[4] by the twofold serial dilution technique and by a modification of the three-hour turbidimetric method of Osgood and his associates[5]. Because of the rapid loss of potency exhibited by solutions of aureomycin at physiologic ranges of temperature and pH, this latter procedure proved to

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5. (a) Osgood, E. E. and Graham, S. M.: A Simple Rapid Method for Assay of Bactericidal and Bacteriostatic Agents, Am. J. Clin. Path. 17:93-107 (Feb.) 1947.
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have a distinct advantage over tests requiring longer periods of incubation.

The principles, calculations, and technique involved in the turbidimetric method used in this study are similar to those that have been described in detail by the above mentioned investigators, but its adaptation to the assay of aureomycin and for measurement in a Coleman junior spectrophotometer required the following changes:

1. The use of 19-by-150 mm. test tubes required a final volume in each tube of 6 cc. (a 0.5 cc. aliquot of the test sample, 0.5 cc. of distilled water in which the aureomycin standard or other agents were added, and 5 cc. of the test culture).

2. The most suitable aureomycin standard was found to be one that gave a final concentration of 0.1 microgram per cubic centimeter in the test. This concentration was obtained by adding 0.5 cc. of distilled water containing 1.2 micrograms of aureomycin per cubic centimeter.

3. A culture of the reference strain in its early logarithmic phase of growth was used when it had reached an optical density reading of 0.04 to 0.05 Coleman units, preferably 0.045 units.

4. Readings of optical density were most reliable when made 1½ and 2½ hours after the onset of the test. At later periods measurements were often affected by deviations in the straight-line phase of growth of the reference organisms. This was particularly true when serum was included in a test. If a pure culture of the reference strain is used and if the other constituents in the test are not grossly contaminated, the assay may be performed without the use of sterile technique.

An analysis of consecutive assays of samples of known aureomycin potency, made during the period that this turbidimetric method was under investigation, demonstrated an accuracy of ±27 per cent in drug concentrations ranging from 0.24 to 2.4 micrograms per cubic centimeter (final concentrations in the test 0.02 to 0.2 microgram per cubic centimeter). When familiarity with the technique had been acquired and when the controls, standard, and "unknowns" were each tested in duplicate, this error was reduced to ±12 per cent. By increasing the initial optical density of the reference culture, higher antibiotic levels could be measured, and when the culture density was decreased the reverse was found to be true. On the other hand, it was noted that, for test samples that fell above or below the range of 0.24 to 2.4 micrograms per cubic centimeter, the accuracy of measurement was greater if they were diluted or added in larger volumes to a test and the inoculum size of the staphylococcus kept constant.

Some Physical Properties of Aureomycin

Stability

The results of a study on the stability of aureomycin in several common diluents at 37 C., 4 C., and −20 C. is shown in table 1. The *p*H that resulted from the addition of powdered drug to each solution was not adjusted. Aureomycin demonstrated a rapid loss in potency at 37 C. in all of the diluents that were studied; this loss was particularly evident in solutions that were neutral or slightly alkaline. The drug was inactivated more slowly at average ice box temperature (4 C.); the increase in stability at this temperature was significant in 24 hours for all solu-

Table 1

The Effect of Time, Temperature, and Hydrogen Ion Concentration on the Stability of Aureomycin in Several Common Diluents

SERIAL DILUTION ASSAY — *TURBIDIMETRIC ASSAY*

Drug concentration	*Nutrient Broth* 500 mcg./cc.			*M/20 PO4 Buffer* 500 mcg./cc.			*Physiologic Saline* 500 mcg./cc.			*Distilled Water* 500 mcg./cc.			*Serum (90%)* 1.9 mcg./cc.			*Distilled Water* 1.2 mcg./cc.	
pH of mixture	7			7.3			5.5			5.4			7.4			5.5	
Storage temperature (C.)	37	4	−20	37	4	−20	37	4	−20	37	4	−20	37	4	−20	4	−20
Storage for 24 hours	−16	−2	0	−32	−2	0	−2	0	0	−2	0	0	0	−21%	−13%	+1%	
Storage for 48 hours	−32	0	0	−64	−2	0	−2	0	0	−2	−2	0		−42%	−13%	−17%	−10%
Storage for 72 hours	−32	−4	−2	−128	−4	−2	−2	−2	−2					−32%	−1%	−67%	−75%
Aureomycin activity*																	

* Aureomycin activity is expressed as the potency of an aliquot of the test solution in terms of its fold decrease after the start of the experiment when measured by the serial dilution assay method (±50-100% error), and in terms of percentage of zero hour activity when measured by the turbidimetric assay procedure (±12 per cent error).

tions that were not at an acid *p*H. Aureomycin in distilled water appeared to be the most stable of the solutions at 4 C., but during the third 24-hour period of storage a 65 per cent loss of potency occurred. Within experimental error, the antibiotic was stable in all diluents and at all *p*H ranges if it was stored in the frozen state (−20 C.) for not longer than 48 hours. It therefore appears that the stability of aureomycin in solution is inversely related to time and temperature, and is proportional to the final hydrogen ion concentration in the solution.

Aureomycin was very rapidly inactivated in fresh human serum during incubation at 37 C. Turbidimetric assays performed in quadruplicate on such mixtures showed a 29, 35, and 57 per cent fall in the titer of the antibiotic after one, two, and three hours respectively. To determine whether this loss of activity was due to the formation of an inactive combination of aureomycin with albumin—similar to the penicillin-albumin complex—the activity of 0.1 microgram of aureomycin in nutrient broth was compared with that of the same amount of drug in broth containing human serum or albumin; the final concentrations of albumin in these last two mixtures were equal. The results, including the relative growth rates of the reference strain of *Staph. aureus* in the various mixtures without added aureomycin, are shown in table 2.

The marked loss of the drug's antibacterial activity in the presence of human serum could not be explained on the basis of an interaction of aureomycin with albumin. The actual increase in the drug's potency that was apparent in solutions containing 1 per cent albumin may be due to the stimulating effect of albumin on the growth of the reference organism when other constituents of human serum are absent. The effectiveness of other antibiotic agents is known to be greater when the multiplication rate of a micro-organism is increased. The relationship between the antibacterial potency of aureomycin and the rate of bacterial growth appears to be of a similar nature.

Effect of procaine on potency of aureomycin

The intramuscular injection of aureomycin in distilled water gives rise to a considerable degree of local discomfort that can be somewhat reduced if a neutral buffer is used as the vehicle for the drug. By mixing 0.5 cc. of 1 per cent procaine with a dose of aureomycin, injections may be made more tolerable. It was demonstrated that this latter procedure had no effect on the potency of the drug. *In vitro* tests showed that the highest concentrations of procaine hydrochloride used—100 mg. per 100 cc.—failed to inhibit or stimulate the action of this antibiotic.

Failure to penetrate the membrane of human red blood cells

As compared with penicillin and streptomycin, aureomycin is unique in its ability to exert a detrimental effect on certain intracellular pathogens—an observation which suggests that it may pass through cell membranes. The following experiment was designed to test such a hypothesis in regard to the membrane of human red blood cells. Aureomycin was added to heparinized whole blood and to serum in equal final concentrations; the solutions were mixed thoroughly, and placed at 4 C. for 30 minutes. This temperature was chosen to minimize drug in-

Table 2

The Antibacterial Activity of Aureomycin in Nutrient Broth Compared with That of the Antibiotic in Broth Containing Human Serum or Human Albumin.

Media	*Final Concentration of Aureomycin Added*	*Measurable Antibacterial Activity*	*Percent. of Activity in Broth Alone*	*Relative Growth Rates of* STAPH. AUREUS *in Each Medium*†
Broth	0.1 mcg./cc.	0.100 mcg./cc.*	100%*	1.000
Broth + 10% serum	0.1 mcg./cc.	0.058 mcg./cc.	−42%	1.075
Broth + 25% serum	0.1 mcg./cc.	0.056 mcg./cc.	−44%	1.120
Broth + 0.4% albumin	0.1 mcg./cc.	0.095 mcg./cc.	−5%	1.525
Broth + 1% albumin	0.1 mcg./cc.	0.125 mcg./cc.	+25%	1.990

* Reference point for 100 per cent activity on which the comparisons were based.

† Ratio of Control Growth Rates = $\frac{\text{Tangent of the angle made by the straight-line portion of the growth curve in each type of medium without antibiotic}}{\text{Tangent of the angle made by the straight-line portion of the growth curve in nutrient broth without antibiotic}}$

Values greater than 1.000 indicate a rate of growth of the reference strain that is greater than its growth in tryptose phosphate broth without serum or albumin.

activation, and would have little effect on the rate of diffusion of a substance. Turbidimetric assays were then done in duplicate on the supernate of the centrifuged whole blood and on the serum. In the former, which had a hematocrit of 44 per cent, the drug exhibited twice as much activity as in the serum. Within the ±12 per cent error of the assay procedure, aureomycin failed to penetrate the red cell membrane in measurable amounts.

Serum Levels of Aureomycin Following a Single Intramuscular Injection in Human Beings

A single dose of 40 mg. of aureomycin was given to 8 convalescent patients by the intramuscular route. Each dose was administered immediately after it had been dissolved in 4 cc. of sterile twentieth molar phosphate buffer plus 0.5 cc. of 1 per cent procaine hydrochloride. The ages of the subjects ranged from 25 to 59 years. No evidence of cardiac, hepatic, or renal damage was demonstrated in these patients, and all were able to concentrate urine to a specific gravity of greater than 1.020. Blood was drawn for assay purposes before the drug was administered and at various time intervals thereafter, as indicated in table 3. The results of these tests in the first two subjects indicated that aureomycin was slowly absorbed from the site of injection; therefore, in the remaining 6 individuals, samples were taken at longer intervals.

In order that maximum activity could be measured, the blood samples were centrifuged after being placed in an ice box for one hour, and the serum was frozen rapidly in an alcohol bath at −20 C. Serum levels of aureomycin were determined by the rapid turbidimetric method within 24 hours after a specimen had been received. The observations are shown in table 3, and though they are few in number they attest the value of the three-hour method of assay. These low levels of activity could not be measured by procedures that required a long incubation period. In 6 subjects maximum serum concentrations first appeared in specimens that were obtained three or six hours after a dose, and antibacterial activity was detectable at nine hours in 5 of the 6 specimens tested.

Comparison with Other Antibiotics in Vitro

Mechanism of action

The mechanisms of antibacterial action of aureomycin and penicillin were compared by a study of the growth of *Staph. aureus* in liquid media containing these agents. Tubes of nutrient broth containing respectively 1 and 0.1 microgram of aureomycin per cubic centimeter, 0.1 and 0.01 unit of penicillin per cubic centimeter, and no antibiotic were each inoculated with approximately 560,000 organisms from an eighteen-hour culture of the reference strain, and incubated in a water bath at 37 C. Counts of the viable organisms in each tube were made five times during a 24-hour period by pouring appropriate dilutions of a culture aliquot and agar media at 45 C. After these pour plates had been incubated for 24 hours at 37 C., the visible colonies that appeared were counted. The number of colonies was taken as the count of viable bacteria per cubic centimeter when corrections had been made for the dilution represented by each aliquot. The combined results are shown in figure 1, in which the logarithm of the number of surviving organisms per cubic centimeter for each tube is plotted against the hours of incubation of each test.

The actions of aureomycin and penicillin against *Staph. aureus* are similar. In low concentrations both drugs cause an inhibition of growth. Between the sixth and twelfth hours, the complete bacteriostasis due to 0.1

Table 3

Serum Concentrations of Aureomycin in Eight Human Beings Following a Single Intramuscular Dose of Forty Milligrams

Hours after Dose	SERUM CONCENTRATIONS OF AUREOMYCIN (Micrograms per Cubic Centimeter)							
	Subject 1	*Subject* 2	*Subject* 3	*Subject* 4	*Subject* 5	*Subject* 6	*Subject* 7	*Subject* 8
½	0.08	0.14						
1	0.20	0.12						
2	0.16	0.06						
3			0.31		0.17	0.43	0.68	0.73
4	0.12	0.08						
6			0.10	0.81	0.00	0.45	0.34	0.73
9			0.16	0.48	0.18	0.45	0.00	0.43
12			0.00				0.00	0.00

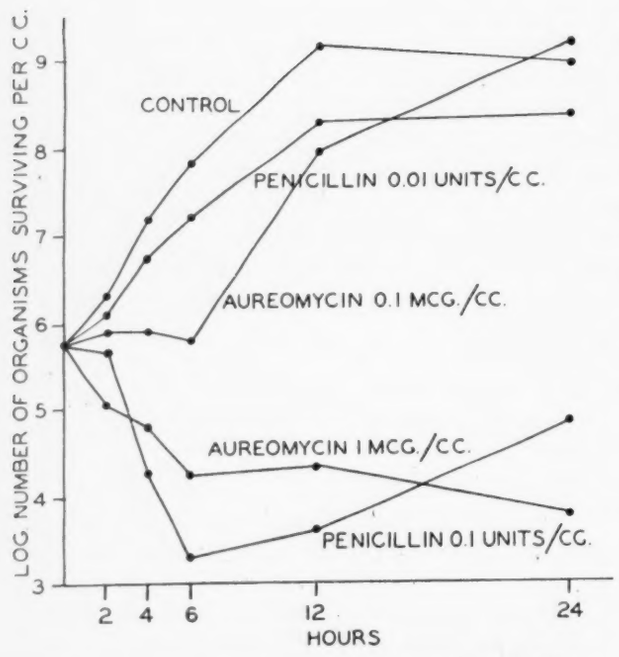

Fig. 1. The effect of aureomycin and penicillin on the growth of Staphylococcus aureus in vitro.

microgram of aureomycin per cubic centimeter was overcome and followed by the unrestricted growth of the culture. A tenfold increase in the concentration of aureomycin and penicillin resulted in the rapid killing of the majority of the organisms in the inoculum. The bactericidal effect of drugs in these concentrations was noted for six hours, and was followed in both instances by bacteriostasis that persisted for the remainder of the 24-hour observation period.

Antibacterial properties

The activities of aureomycin, penicillin and streptomycin against 32 strains of pathogenic bacteria were compared *in vitro;* the majority of the organisms had been recently isolated from human beings. Because of the relative ineffectiveness of penicillin against most of the gram-negative bacilli, tests of their sensitivity to this agent were omitted. The observations recorded are summarized in table 4.

Like penicillin, aureomycin was much more effective against the gram-positive cocci than against the gram-negative organisms that were tested. It is not surprising, in view of the rapid inactivation of aureomycin in alkaline solution, that the two species of bacteria which produce large amounts of alkali during their growth (*Proteus vulgaris* and *Alcaligenes fecalis*) exhibited a high degree of resistance to the action of this antibiotic. The susceptibility of individual bacterial strains to the three antibiotics varied independently and in a random fashion. Bacterial variants isolated from streptomycin-sensitive strains and showing an increased resistance to this antibiotic failed to demonstrate a concomitant increase in their resistance to aureomycin. In a patient with subacute bacterial endocarditis who was being treated with penicillin and streptomycin, a strain of *Streptococcus viridans* (no. 16) had developed a high degree of fastness to these drugs; this strain was relatively sensitive to aureomycin *in vitro.*

Comment

Range of effectiveness

Unpublished reports from several clinics indicate that aureomycin has been effective in the treatment of Rocky Mountain spotted fever, endemic typhus, Q fever, and lymphogranuloma venereum in human beings, and that this new antibiotic deserves an extensive clinical trial in these infections and in those due to related micro-organisms[1]. Experiments described in this paper have demonstrated that aureomycin also has a potent antibacterial action *in vitro.* The activity of very low concentrations of this drug against strains of *Staph. aureus, Strep. viridans, Streptococcus pyogenes,* and *Streptococcus fecalis* warrants an investigation of the clinical value of aureomycin in diseases due to these organisms. Unlike the gram-positive species that were treated, the gram-negative bacilli were relatively resistant to this antibiotic; as a whole, this latter group of organisms showed a greater susceptibility to streptomycin.

The development of fastness to streptomycin *in vitro* did not affect the sensitivity of bacteria to aureomycin. A strain of *Strep. viridans* that had become resistant to penicillin and streptomycin *in vivo* was found to be sensitive to very low concentrations of aureomycin *in vitro.* Drug fastness is a property of bacterial strains that varies in an independent manner for each chemotherapeutic agent. Aureomycin may prove of great value, therefore, in certain instances where treatment with penicillin or streptomycin has failed because the infecting organism is naturally resistant or develops resistance to these drugs.

Table 4

The Comparative Sensitivity of Common Pathogenic Bacteria to Aureomycin, Streptomycin, and Penicillin

Organism	*Strain Number Tested*	*Inoculum Size (Organisms per Cubic Centimeter)*	*Antibiotic Sensitivity (Micrograms per Cubic Centimeter)*		
			Aureomycin	*Streptomycin*	*Penicillin**
Staphylococcus aureus	1	17,000	0.3	3.1	0.02
	2	18,000	0.3	3.1	0.15
	3	26,000	0.3	3.1	0.02
	4	2,000	0.3	0.8	0.02
	(Var.) 4	5,000	0.1	> 50	0.01
	5	7,000	0.7	3.1	0.15
	6	80,000	0.3	12.5	0.02
	7	2,000	< 0.1	0.3	0.01
	8	3,000	0.1	1.5	0.01
	9	1,000	< 0.1	0.1	< 0.005
	10	20,000	< 0.1	1.5	0.04
	11	13,000	0.3	6.3	0.02
	12	21,700	0.3	6.3	0.30
Streptococcus pyogenes	13	6,000	1.5	12.5	0.005
viridans	14	2,000	0.1	12.5	—
	15	1,000	0.1	0.1	—
	16	71,000	1.5	> 50	1.5
fecalis	17	100,000	1.5	> 50	0.3
	18	5,000	0.7	> 50	1.5
nonhemolyticus	19	36,000	0.1	12.5	0.01
Aerobacter aerogenes	20	120,000	3.1	3.1	
	21	84,000	6.2	> 50	
Escherichia coli	22	60,000	50	—	
	23	70,000	25	—	
	24	71,000	6.2	6.2	
	25	94,000	3.1	6.2	
Alcaligenes fecalis	26	26,000	> 50	3.1	
Salmonella suipestifer	27	78,000	25	25	
Proteus vulgaris	28	230,000	> 50	12.5	
	29	100,000	> 50		
Klebsiella pneumoniae	30	89,000	50	1.5	
	31	77,000	25	0.8	
	(Var.) 31	32,000	25	1.5	
	(Var.) 31	42,000	25	6.0	
	(Var.) 31	44,000	25	> 50	
Pseudomonas aeruginosa	32	65,000	12.5	3.1	
	33	300,000	> 50	> 50	

(Var.) = Varient strains isolated from their streptomycin-sensitive parent and demonstrating different degrees of fastness to this antibiotic.

> = Greater than

< = Less than

* One Oxford unit is equal to 0.6 microgram.

Instability

A rapid loss of potency was exhibited by crystalline aureomycin hydrochloride in human serum, nutrient broth, and several of the common diluents. As the inactivation of the drug was particularly evident at 37 C. and in neutral or slightly alkaline solutions, a pharmacologic evaluation of aureomycin *in vivo* will be significantly concerned with this property. Microbiologic methods of assay that require more than six hours of incubation are of little value in measuring serum levels of aureomycin in human beings; a three-hour turbidimetric method proved to be practical and dependable. Furthermore, the unstable nature of this drug at a neutral *p*H requires the frequent preparation of fresh solutions if parenteral therapy must be used.

These handicaps may be overcome to a large degree, if the chemical structure of this drug can be modified in such a way as to make it more stable without affecting its chemotherapeutic activity. In addition, a more stable compound should increase materially the duration of the effective action of this drug *in vivo*.

Summary

Aureomycin, an effective antibiotic in the treatment of infections caused by rickettsias and certain viruses, was shown to have an

antibacterial action against some of the common pathogens *in vitro*. The high degree of activity demonstrated by this drug against *Staph. aureus* and the different species of streptococcus warrants an investigation of the therapeutic effectiveness of aureomycin in diseases due to these organisms. These findings further indicate that the use of aureomycin alone in diseases due to intracellular micro-organisms should also provide protection against the occurrence of secondary bacterial complications in these diseases.

Aureomycin is rapidly inactivated in human serum and other vehicles at physiologic ranges of temperature and *p*H. This property made the usual procedures for assaying the activity of chemotherapeutic agents of little clinical value. A rapid three-hour assay method was shown to be reliable and practical for measuring serum levels of aureomycin in human beings and for studying some of the properties of this drug.

Aureomycin exhibits both a bactericidal and a bacteriostatic action against *Staph. aureus*, the same mechanisms of action shown by penicillin against this organism.

Though aureomycin is effective against intracellular micro-organisms, its diffusion into human red blood cells could not be demonstrated.

THE PATHOGENESIS, DIAGNOSIS, AND TREATMENT OF VARICOSE VEINS AND VARICOSE ULCERS

Analysis of Two Hundred Cases Treated by Upper Saphenous Ligation

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Varicose veins of the lower extremities and the complications which arise from them are seen by all physicians, regardless of their specialty. Larson[1] estimates that they occur in 10 to 17 per cent of the population. They are encountered more frequently in women than in men. In a series of 285 cases studied by Ochsner and Mahorner[2], 247 patients were females and 38 were males. The authors stated, however, that the high proportion of females in their series was due to the fact that 62.6 per cent of the women examined came to the clinic because of pregnancy and not primarily because of the varicosities. In our series of 200 cases seen in private practice, 117 patients (58.5 per cent) were women and 83 (41.5 per cent) were men.

Of the cases studied by Stuebner[3], both extremities were affected in 52 per cent, and only one extremity in 48 per cent. In our series these figures were reversed, both lower extremities being involved in 48 per cent and only one leg in 52 per cent. In our cases the duration of the disease ranged from six months to thirty years, the average being seven and a half years. The youngest patient was 17 years of age and the oldest 65. The greatest number of patients were in the age group between 30 and 35.

Pathogenesis

Homans[4] has defined varicose veins as "nothing more than a superficial vein, almost necessarily a great saphenous, which having lost its valves is unable to transmit blood against gravity." Therefore, the symptoms produced by varicosities of the lower extremities are the result of progressive venous insufficiency.

Among the factors which contribute to the development of varicose veins and varicose ulcers are heredity, phlebitis, upright posture of man, congenital anomalies of valves, increased intra-abdominal pressure, and hypercoagulability of blood within damaged veins. We are convinced that the most important of these are heredity and thrombophlebitis. In our series, 49 per cent of 162 patients questioned gave a history of varicose veins in their families, and thrombophlebitis was found to have been present in 22 per cent of 185 cases. Larson and Smith[1] found a family history of varicosities in 43 per cent of their cases and a past history of thrombophlebitis in 11 per cent.

De Takats[5] believed that man's erect posture has put an unusual strain upon the saphenous network. When the valves have become incompetent, the long column of

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blood in the saphenous system induces a postural venous hypertension responsible for varicosities of the lower extremities. By the dissection of cadavers, Eger and Casper[6] showed that the valves of the external iliac veins were absent bilaterally in 36.8 per cent and unilaterally in 52 to 55 per cent. They found that no valves were present in the common iliac veins and the vena cava. The absence of valves in the veins above the orifices of the great saphenous imposes an even greater burden of support on the valves of the saphenous system. Lawes[7] believed that valvular deficiency is the result of congenital and physical factors.

Adams[8] has stressed the fact that the increased intra-abdominal pressure produced by such factors as coughing, straining, pregnancy, and abdominal tumors has a dilating effect on the saphenous system. The valve leaflets and vein walls are stretched by repeated increases in the intravenous pressure from above downward, and valvular incompetency and dilatation result. Shafiroff[9] studied the coagulability of blood in diseased extremities, and found it to be four and a half times greater than that of blood in normal extremities. Chronic lymphedema is thought by Mark[10] to play a dominant role in the pathogenesis of swelling of the legs associated with varicose veins.

Diagnosis and Evaluation

The patient complains of a sense of fatigue in the involved extremity which, after exercise or long standing, often amounts to aching or cramping pains. In many instances there is an annoying amount of ankle edema, which disappears during the night. It is significant that neither the severity of the symptoms nor the amount of swelling present is directly proportionate to the apparent size of the varicosities. Many patients with extremely large veins have few symptoms and no edema. We are convinced that edema which does not completely subside during the night and is not relieved by elevation of the extremity or external support will result in a hard, brawny induration that is tender and very painful, and is the precursor of ulceration. In nearly all such cases there is some incompetency of the valves of the deep veins.

The numerous tests that have been devised for determining the status of the venous circulation in the extremities are outlined by Harkins and Schug[11]. We have found that the comparative tourniquet test described by Mahorner and Ochsner[12] gives adequate information, and we have relied on it alone. In our series of 200 cases, we found that 89 per cent had a positive test and 11 per cent a negative test. This test gives information as to the valvular competency of the superficial venous system, the patency of the deep veins, the degree of involvement of the greater or lesser saphenous systems, and the presence and location of any perforating or communicating branches whose valves are incompetent.

Smithy[13] stressed the fact that edema of the extremity may make the diagnosis more difficult by masking the presence and severity of varicosities and by interfering with correct interpretation of tourniquet tests. If the edema is due to obstruction or occlusion of a deep vein, the varicosities would be the *result* of processes producing edema, rather than the cause. He suggested that venographic studies be done on patients who have both edema and varicosities, in order to evaluate clearly the condition of the deep circulation. Incompetency of the deep veins was present in 22 (11 per cent) of our patients, and 27 per cent of these gave a history of having had phlebitis in the past.

Complications

Indolent ulceration and brawny induration of the leg are the most common complications of varicose veins. Of our 200 cases, 30 per cent had ulcers which had been present for periods ranging from less than one year to thirty years. The varicose ulcer is fairly characteristic in appearance and is readily diagnosed, especially when it accompanies the typical picture of varicosities of the lower extremity. However, the lesion must be differentiated from those produced

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13. Smithy, H. G.: Complicating Factors in the Surgical Management of Varicose Veins, Surgery 17:590-605 (April) 1945.

Fig. 1(A). This 46-year-old woman had had varicose ulcers of both legs for seventeen years. Moderate-sized varicose veins were present in both legs.

Fig. 1(B). The same patient two months after bilateral high saphenous ligations. The ulcers were treated with Furacin ointment and elastic bandages.

by syphilis, malignancy, and sickle cell anemia. Chronicity is the outstanding feature of varicose ulcers, and they characteristically develop on the medial or lateral aspect of the lower third of the leg, just above the malleoli.

Smithy[13] stated that "the underlying factor in the causation and perpetuation of varicose ulcers is chronic tissue hypoxia incident to venous stasis." This results in fibrosis and diminution in vascularity, rendering the ulcerative area extremely resistant to treatment. Frequently the greater part of the lower calf is brawny, indurated, discolored, and slightly tender, with a shiny, thin-appearing surface. The ulcers usually weep, producing irritation and eczematoid lesions in the skin surrounding them.

According to Homans[14], this "varicose eczema" is thought to be produced by sensitization of the tissues to foreign protein absorbed from the feet, toes, and nail beds. The antigen is retained, probably, in the edema fluid of the leg for long periods of time. It appears to injure the walls of the arterioles, causing extravasation of blood into the tissues (hence the pigmentation) and giving rise to a slow necrosis of fat with scar formation. The source of the antigen may be a fungus—namely, trichophyton—, although some cases seem to be caused by a bacterial antigen. We agree with this antigenic theory, since a number of our patients with eczematoid lesions of the skin surrounding ulcers have developed similar lesions on the hands and other parts of the body.

Treatment

In the treatment of varicose veins and ulcers, the primary object is to improve the circulation of the involved extremity by obliterating the valveless saphenous system. Once this is accomplished, the ulcerative lesions tend to heal. The use of scarlet red ointment or Furacin ointment on the ulcer, plus a pressure bandage producing external support over the lesion, facilitates healing. Ochsner[15] believes that the compression of superficial veins by means of bandages increases the flow of blood to the deep veins and overcomes circulatory stasis. The time-honored Unna's paste boot or Gelocast bandage is quite satisfactory (fig. 1). We have advised our patients who have persistent

14. Homans, John: Late Results of Femoral Thrombophlebitis and Their Treatment, New England J. Med. 235:249-253 (Aug. 22) 1946.

15. Ochsner, A.: Venous Thrombosis, J.A.M.A. 132:827-833 (Dec. 7) 1946.

Fig. 2(A). Healthy granulating varicose ulcers of the lower leg in a 48-year-old woman.

Fig. 2(B). Varicose ulcers healed by pinch grafting.

brawny edema of the extremities to wear elastic bandages or elastic stockings continuously while out of bed. In some cases it may be necessary to apply pinch grafts in order to obtain healing of the ulcer (fig. 2). The edema and disagreeable symptoms have been minimized by such measures.

In certain selected cases, ligation of the superficial femoral vein just distal to its junction with the deep femoral vein is advisable. We have noted a reduction in edema and improvement in symptoms following this procedure but do not have a large enough series of cases to draw definite conclusions.

In this group of 200 cases, 16.5 per cent of the patients had had inadequate ligations or injections or both in the past, and still had severe symptoms. The method we have used, after determining the status of the deep circulation and locating the level of any perforating branches by use of the comparative tourniquet test, has been high ligation of the great saphenous vein and all its tributaries at the sapheno-femoral junction, and local ligations of incompetent communicating branches (fig. 3). Postoperatively, any prominent local varicosities were injected locally with a 5 per cent solution of sodium morrhuate, a 2 per cent solution of Soricin, or a hypertonic glucose-saline solution. Pressure bandages were applied at the sites of injection. No retrograde injections of any sclerosing agents were done at the time of the original ligations.

Soricin (sodium ricinoleate) was substituted for sodium morrhuate in a small percentage of patients who had a severe local reaction or some generalized reaction to the latter. Hypertonic glucose-saline solution was employed in a few patients who could not tolerate either of the other agents. Cooper[16] has listed many substances used in injection therapy. The sole purpose of such therapy is to damage the intima of the vein by means of a chemical reaction, producing a firm thrombus in the vein which fibroses and obliterates the lumen of the vessel.

We do not recommend that any injections be given prior to ligation of the saphenous vein. Dodd[17] recommended the retrograde injection of 20 cc. of a 3 per cent saline solution at the time of saphenous ligation. Hey-

16. Cooper, W. M.: Clinical Evaluation of Sotradecol, a Sodium Alkyl Sulfate Solution, in the Injection Therapy of Varicose Veins, Surg., Gynec. & Obst. 83:647-652 (Nov.) 1946.
17. Dodd, H.: Radical Operation for Varicose Veins, Brit. M. J. 2:814-816 (Dec. 23) 1944.

Fig. 3(A). This 49-year-old woman had had varicosities of the greater and lesser saphenous systems of the left leg for twenty years. An incompetent communicating branch was present on the medial side of the lower thigh.

Fig. 3(B). Leg of the same patient two weeks after high and low saphenous ligations were done. Several subsequent injections of a 5 per cent solution of sodium morrhuate were given to obliterate the few remaining varicosities in the lower leg.

erdale[18] advocated a similar type of injection with sodium morrhuate; however, Tunick[19] and Harkins[11] were opposed to any injections during operation and believed that varying degrees of arterial spasm in the extremity commonly follow retrograde injections of sclerosing agents. Harkins felt that such treatment may be so painful and cause so much reaction that the patient may be forced to go to bed, thus increasing the danger of embolism.

Homans[4] recommended high and low ligations, with early ambulation to prevent secondary thrombosis and embolism. In our group the ligations were performed under local Novocain anesthesia, and the patients were allowed to walk immediately after operation. They were encouraged to remain ambulatory during their entire postoperative period, while local injections were being given.

Surgical technique

Our practice has been to expose the upper saphenous segment through a longitudinal incision extending from just below Poupart's ligament distally for approximately three and a half inches over the palpable groove in which lies the main vein trunk. Through this incision the saphenous vein and all of its uppermost tributaries can be dissected cleanly, clamped, resected, and ligated. If difficulty is encountered in identifying the saphenous vein, it has been our experience that a search in the more medial aspect of the wound will usually lead to its discovery.

The anatomic arrangement of the saphenous and its tributaries is so bizarre that no two cases demonstrate a similar pattern. Lawes[7] used the term "varicose anatomy" in describing the arrangement of the five main tributaries—namely, medial and lateral femoral cutaneous, and three superficial branches (external pudendal, circumflex iliac, and epigastric). Buxton[20] pointed out various deviations from the normal in the tributaries of the upper saphenous network. It is necessary that all of these branches be

18. Heyerdale, W. W.: Clagett, O. T., and Anderson, E. M.: Treatment of Acute Superficial Thrombophlebitis in Incompetent Venous System of Lower Extremities, Proc. Staff Meet., Mayo Clin. 18:1-4 (Jan. 28) 1943.
19. Tunick, I. S., Nach, R. L., and Weinle, I.: Arterial Spasm Secondary to Ligation and Retrograde Injection of Saphenous Vein, Surgery 17:413-418 (March) 1945.
20. Buxton, R. W., Farris, J. M., Moyer, C. A., and Coller, F. A.: Surgical Treatment of Long-Standing Deep Phlebitis of Leg; Preliminary Report, Surgery 15:749-756 (May) 1944.

dissected out meticulously and ligated. If any principal branch is omitted, it may become so dilated as to cause subsequent involvement of the veins distal to it, and recurrence of varicosities in the involved extremity. It is not uncommon, particularly in patients who have had phlebitis, to find the regional femoral lymph nodes enlarged at the time of vein ligation.

A maneuver we have found helpful in the dissection of the upper saphenous segment is to clamp and ligate the main trunk in the distal part of the operative field. Then, by retracting the proximal segment upward and using blunt and sharp dissection along the posterior portion of the vein, all of the branches can be demonstrated easily, clamped and ligated. This method is advocated also by Zax[21].

After the dissection is completed, the saphenous trunk is doubly ligated as close to its entrance into the femoral vein as possible, and a 2- to 3-mm. cuff of vein is left distal to the ligature. The subcutaneous fascia is closed with a fine continuous catgut suture to lessen tension on the skin sutures. Any communicating branches which are present along the distal portion of the saphenous system are dissected and ligated through separate small incisions.

Hodge, Grimson and Schiebel[22] advocated a vein-stripping procedure in certain selected cases. We have not employed this type of treatment in this group of cases.

Results of Treatment

In this series of 200 cases, high saphenous ligation with subsequent local injection therapy produced improvement in symptoms and physical findings in 169 patients (84.5 per cent). The majority of patients received from one to ten injections to obliterate remaining varicosities. In patients with ulcer, local treatment to the lesions was required in order to obtain healing. In 7 cases the ulcer recurred or failed to heal, even after prolonged treatment. In 2 cases ulcers healed completely after pinch grafting was done.

In 22 cases (11 per cent) incompetency of the deep veins was demonstrated. Upper saphenous ligations produced amelioration of symptoms, reduction of edema, and improvement in ulcers in 5 of these patients. Homans[4] stated that "in-as-much as the high pressure and congestion in varicosities of the superficial system always adds to the load on the deep circulation, any procedure which decreases that load must be helpful."

Five patients who showed no definite involvement of the deep venous system continued to have some edema after prolonged treatment. In 4 cases recanalization of the superficial system occurred, requiring repeated local injections to maintain obliteration of this system.

The less satisfactory results were obtained in those patients who had deep vein involvement with long-standing ulcerations. Such patients were advised to use external supportive bandages indefinitely to control symptoms.

Summary and Conclusions

A study of 200 patients with varicose veins and their complications revealed the following facts:

1. The disease occurred more frequently in women than in men, and involved one extremity more often than both. The greatest number of cases occurred in patients between 30 and 35 years of age. The average duration of the disease was seven and a half years. Approximately one third of the patients had ulcers.

2. In 49 per cent of 162 cases, a family history of varicosities was obtained.

3. The Ochsner-Mahorner comparative tourniquet test was employed preoperatively to determine the status of the venous circulation of the extremity and the location of communicating branches whose valves were incompetent.

4. Good results were obtained in 84.5 per cent of the cases after saphenous ligation and subsequent local injection of varicosities.

5. In patients with persistent edema of the lower extremities, edema was controlled to a great extent by constricting elastic bandages or stockings. It is perhaps advisable for this group of patients to have superficial femoral ligations.

21. Zax, E.: Terminal Saphenous Resection: Report on over 300 Cases, Texas State J. Med. 41:307-309 (Oct.) 1945.
22. Hodge, G. B., Grimson, K. S., and Schiebel, H. M.: Treatment of Varicose Veins by Stripping, Excision and Evulsion, Ann. Surg. 121:737-750 (May) 1945.

Obesity is prejudicial to long life. Of the individuals that have lived to a ripe old age, how many have you seen that are much overweight? Very few, I venture to say. The very old person is almost invariably lean and often very thin. — Theodore Klumpp: The Future of the Older Worker, Geriatrics 2:166 (May-June) 1947.

PRESENT STATUS OF THE STUDY OF HUMAN FATIGUE

A. T. MILLER, JR.

CHAPEL HILL

The present status of the study of human fatigue is one of confusion. Much of this confusion is due to lack of a precise definition of fatigue. To some, fatigue means a reduced capacity for work, resulting from previous work. That this concept is too narrow is obvious from the fact that many disease states produce an identical condition in resting subjects. Is this fatigue? Unless the condition is to be defined purely in terms of the causal factor, the answer must be *yes*. Again, this narrow concept of fatigue makes insufficient allowance for the concomitant impact of other environmental stresses, such as high temperature and humidity. Since the severity of fatigue following a standard amount of work in the same subject varies widely with environmental and sociologic factors (worry, incentive, and so forth), attempts to quantitate fatigue in terms of work have limited practical significance. It is long past time to abandon the naive attempt to explain human fatigue on the same basis as fatigue in the isolated nerve-muscle preparations of the physiologic laboratory.

Reduction in working capacity may also fail, in many cases, to indicate the severity of fatigue. The stumbling block here is the difficulty in evaluating the influence of incentive. In studies on acute exhaustion in our laboratory we have been unable to correlate the subjective impressions of the subject with any measurable physiologic factor. The increased productive output of industrial workers toward the end of a working day is a common example of the influence of incentive. Until incentive can be measured and assigned its proper weight in a total evaluation of contributory factors, any analysis of human fatigue must be incomplete.

Suggested Criteria of Fatigue

In view of these considerations, it is apparent that the study of human fatigue must, for the present, be largely empiric. The first requirement is general acceptance of some criterion of fatigue. In general, criteria advocated by various workers fall into three categories: (1) decrease in work capacity, (2) measurable physiologic changes, and (3) subjective impressions of the subject. It is well to examine the evidence supporting each of these concepts.

Decrease in work capacity

The basic assumption is made that the extent of the decrease in work capacity is directly correlated with the severity of fatigue—in fact, that it *is* fatigue. This assumption seems to be true, however, only in the case of exhausting physical exertion, and even here the correlation is often very poor. In exhaustion experiments in our laboratory the subjects have not been able to attribute their complete loss of capacity for further work to any single factor; for the most part minor discomforts, such as drying of the respiratory mucosa, stand out in their minds. Inability to make their muscles continue to work is rarely reported.

Work capacity is diminished under conditions of high temperature and humidity, and in anoxia, hypoglycemia, dehydration, starvation, and certain diseases, notably Addison's disease and myasthenia gravis. To consider that all of these diverse conditions represent a state of fatigue would make the term "fatigue" so broad as to be devoid of precise scientific meaning. One is forced to conclude that a reduced capacity for work is not synonymous with fatigue, and that it may not even afford a good index of the presence of fatigue. The most one can say is that reduced capacity for work and subjective impressions of discomfort and disinclination for work frequently occur together. There is no conclusive evidence that they are causally related in any way.

Measurable physiologic changes

Physiologists like to measure things. It is only natural, then, that they have searched for quantitative changes in the composition of body tissues and fluids and in the normal functioning of the body machinery which would indicate the presence (and perhaps the cause) of fatigue. This aspect of the fatigue problem has been enthusiastically explored, and a mass of data is available. Attempts to formulate a concept of the nature of fatigue on the basis of these data have, for the most part, been disappointing. For example, by analogy with the correlation between loss of work capacity and the accum-

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Read before the Section on the Practice of Medicine, Medical Society of the State of North Carolina, Pinehurst, May 4, 1948.

ulation of lactic acid in isolated frog muscles, blood lactic acid has been measured in many studies on fatigue. On superficial analysis a plausible argument for acidosis as a causal factor in fatigue can be established, since physical exhaustion is usually accompanied by a high blood lactate value. This argument is weakened, however, by the facts that similar degrees of acidosis produced in other ways do not result in exhaustion, and that fatigue can occur with relatively little acidosis. In like manner, the claims for a causal relation between fatigue and deficiency in cardiac output, oxygen consumption, blood sugar, and so forth can be shown to be of doubtful validity. One is forced to conclude that the physiologic basis of fatigue is much more subtle than these gross alterations in function, and refuge must be taken in the vague concept of a disturbance in integration or in homeostasis. The physiologist may finally have to abandon his search with physiologic tools and adopt those of the psychologist.

Subjective impressions

The traditional concept of fatigue includes a feeling of tiredness and disinclination for further exertion. The proper place of these subjective factors in the picture of fatigue is controversial. The physiologist has usually minimized their importance because they defy objective measurement. A more valid reason is the frequent lack of correlation between subjective impressions and objective performance. Individuals vary widely in their reaction to minor discomforts associated with stress of the same intensity, and correspondingly different degrees of fatigue would be reported by these subjects. Also, subjective discomfort in a single individual varies not only with the intensity of the applied stress but also with his interest in the task being performed.

The modern psychologic approach, on the other hand, emphasizes the essentially personal nature of fatigue. It holds that only the subject himself can judge the extent of his fatigue, and that physiologic changes are merely associated phenomena. The obvious difficulty in the practical application of this concept is in evaluating the "discomfort threshold" of different subjects. In our laboratory we hope to place this on a semiquantitative basis by measuring pain thresholds of perception and of reaction with the Hardy-Wolff technique.

Possible Experimental Approaches to the Study of Fatigue

The goal of research on fatigue is twofold: (1) an understanding of the real nature of the condition and of the factors which cause or modify it, and (2) practical means of minimizing the fatigue associated with daily activities or disease. As in the case of all human ailments, treatment not based on a true understanding of the nature of the condition being treated must be largely empiric. It is not surprising, then, that attempts to prevent or alleviate fatigue have run the gamut from vitamins to amino acids. It is also not surprising that these remedies have been almost uniformly unsuccessful. It would seem, then, that attention should be diverted away from treatment and toward an attempt to discover the basic factors responsible for fatigue. To do this, we must first be able to recognize fatigue when it occurs, and further be able to estimate its severity. In other words, we must agree on a criterion of fatigue. Since all the traditional criteria have been shown to be inadequate when used independently, a valid criterion must be sought either in a synthesis of the traditional criteria, or in some entirely new factor. Both of these possibilities deserve to be thoroughly explored. The approach might well follow this course:

(1) A tabulation of all the major stresses whose impact on the human body produces a condition having one or more of the traditional aspects of fatigue.

(2) A careful measurement of physiologic and psychologic changes accompanying these various stresses.

(3) Selection of one or more factors which occur in all or most of the different stress reactions.

(4) A restudy of graded intensities of the various stresses using the selected factors as tentative criteria.

(5) If the tentative criteria vary in a consistent and quantitative manner with the intensity of the stress, they may be adopted as working criteria and the final step undertaken—namely, an attempt to determine the cause of the variation in the working criteria.

This may appear to be a laborious process, and indeed it is. But it is doubtful whether the final goal can be achieved by any other route, and the sooner it is undertaken, the

sooner will the race be won. Then, and only then, can the therapeutic approach to fatigue be based on logical principles rather than on trial-and-error empiricism.

Discussion

Dr. J. H. Ferguson (Chapel Hill): **Fatigue** presents itself in our clinical practice as the problem of **asthenia**, and I should like to extend Dr. Miller's splendid presentation of physiologic fundamentals by a brief comment on three points of practical clinical significance. These are the relationships to (1) **nutrition** and **metabolism**, (2) **anoxia** and (3) **endocrines.**

In studying problems of **nutrition** in relation to industrial capacity, we see asthenia related to an inadequate supply of calories, proteins, and vitamins. Even if Dr. Miller is strictly correct in separating reduced capacity for work and the fatigue problem, the two are, nevertheless, inextricably associated under these conditions. Men cannot reach the heights of their potential capacities for thinking and social behavior if nutritional problems and the basic struggle for physical survival sap their physical, mental, and psychologic activities, and when frustration of the elementary physical goal of body maintenance leads to fatigue, apathy, helplessness, and reduced physical capacity, the asthenia problem is as real as it is severe and complex. The physiologist can at least make the contribution of insisting on nutritional and metabolic correction as prerequisite for approach to the psychological and socio-political angles.

Specific asthenic problems arise in connection with **nutritional and metabolic disfunctions** in diabetes, in gastro-intestinal, digestive, liver and kidney disorders, and in a host of other diseases. Here, indeed, we are on sure ground as to the first line of treatment.

The problem of **anoxia**, acute and chronic, presents itself in very many diseases. The asthenia of all debilitating illnesses involves some aspect of anoxia, which we can consider under several logical heads:

1. Failure to oxygenate the blood properly, as in inadequate atmospheres, and in lung and heart conditions
2. Reduced oxygen-carrying capacity of the blood, as in anemias
3. Inadequate blood (and hence oxygen) supply to tissues, either
   (a) generally, as in circulatory disturbances, or
   (b) locally, as in venous obstruction in a leg
4. Inability of the tissues properly to utilize the oxygen which the blood brings to them, as in various toxic conditions.

Again, the practical problem clearly is a matter of restoring normal respiratory, circulatory, and tissue metabolic activity as a primary requisite for combatting the asthenia. During the asthenic period, the performance limitations of the patient must receive full recognition, sympathy, and attention, including the best possible nursing care. The mental and psychologic factors are very important in the anoxic patient. The better the care, the greater the amelioration of symptoms and the speedier the recovery.

Lastly, some specific relationships of **endocrines** to asthenia will be mentioned, and I will center my remarks around adrenal cortical hormones and the anterior pituitary. Since we are all familiar with the extreme asthenia resulting from severe deficiency of adrenal cortical hormones, as in Addison's disease, I will talk on the broader aspects.

Prolonged physical exercise will cause **hypertrophy** of the adrenal cortex. In Ingle's experiments on rats raising a 100 Gm. weight repeatedly for 120 hours, the weight of the adrenals was nearly doubled (increasing from 26 to 50 mg.).

Adrenalectomized animals, like human patients with Addison's disease, are decidedly asthenic and notoriously sensitive to various types of stress, especially infections, trauma, cold, and anoxia. The amount of adrenal cortical hormone needed to keep them alive is greatly increased if they exercise or suffer any of the above stress conditions.

Control of the adrenal cortical hormone by the anterior pituitary is one of the many physiologic functions of "the master endocrine gland." It is through such controls over a number of endocrines, together with certain direct metabolic and nervous controls, that the body mobilizes its defenses against stress conditions. Let us consider infections, for instance.

Enlargement of the adrenal cortex and depletion of its lipoids occur in many inflammatory diseases. Rich (of Johns Hopkins) regularly found histopathologic lesions in the adrenal cortex of patients dying from meningitis, pneumonia, diphtheria, and streptococcal infections. In the classical Waterhouse-Friderichsen syndrome associated with certain cases of meningitis, adrenal cortical damage with hemorrhagic lesions is pathognomonic. Rich found no such lesions in cases of circulatory collapse from traumatic shock. It does seem, then, that the asthenia of patients acutely ill from severe infections has much to do with the adrenal cortical hormones. We do not know the exact significance of the high content of cholesteral and ascorbic acid in the normal adrenal cortex, but there is evidence that both are related to synthesis of the hormonal steroids. Savers and others have shown that these two substances decrease following hemorrhage, extremes of temperature, trauma, and anoxia. Following acute stress conditions such as infections, burns, and major operations, the urinary excretion of 17-ketosteroids is increased (as much as ten times), and this increase may have a significant relation to the adrenal cortex.

Vollmer and Gilmore reported that mice withstand **mild** pneumococcal infections better if given injections of adrenal cortical hormone, but the hormone does not seem to help in more **severe** infections, where it is needed most.

Adrenalectomized rats at a barometric pressure of 300 mm. of mercury need 20 times as much adrenal cortical hormone to survive. Thorn found that only 8 per cent of normal rats survived pressures equivalent to an altitude of 32,000 feet, whereas 85 per cent survived if given adequate ACH. There is also evidence that the anterior pituitary hormones increase in anoxia.

All that I have said adds up to the fact that physical stress of many kinds is intimately connected with the asthenia or fatigue problem. The body has various physiologic adjustments involving metabolic, respiratory, circulatory, and nervous and endocrine factors. It is of obvious clinical importance to do everything possible to give such factors free play and boost them with all measures and agents we can command.

Chairman Ruffin: Some years ago we were told that when a patient complained of being tired he should be given thiamine. You do not believe that?

Dr. Miller: Only if he has a thiamine deficiency to start with.

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NOVEMBER, 1948

THE FORSYTH COUNTY RESOLUTIONS

When the selective service act passed by the Eightieth Congress was being drawn up, it provided that all doctors under 45 should be drafted. Only the most determined effort on the part of officials of the American Medical Association, and the assurance on their part that a sufficient number of medical officers would be obtained by voluntary enlistments, kept this part of the bill from being enacted into law.

Now that our profession has been again entrusted with the job of furnishing its quota for the new selective service, it is necessary to work out some means of helping the doctors themselves decide whether they are needed more in service or in civilian life. If some plan to insure an adequate number of volunteers for medical service in the armed forces is not put into effect soon, the next Congress will almost certainly make provision for a draft of doctors. It is doubtful that a plan drawn up by politicians could be as equitable as one worked out by doctors themselves.

With this idea in mind, the Forsyth County Medical Society appointed a Committee on Military Affairs to work out a suitable formula for the voluntary enlistment of medical officers. This committee was selected with great care, in order to have every possible viewpoint represented: men who had been in service and those who had not; medical teachers and private practitioners; general practitioners and specialists.

The committee devoted many hours to the task, and their final plan was adopted unanimously by the Forsyth County Medical Society. A copy was then sent to the Executive Committee of the State Society, where it received very favorable comment. One veteran of both World Wars said that it was the fairest plan he had ever seen for selecting medical personnel for the armed forces. Copies were also sent to the secretary of every State Medical Society in the country, and to Dr. Harold R. Hennessy, secretary of the Council on National Emergency Medical Service of the American Medical Association. Dr. Hennessy's reaction was most favorable, as is evidenced by a few excerpts from a letter to Dr. L. C. Ogburn, chairman of the Forsyth County committee:

> "Copies of the report from the Military Affairs Committee of the Forsyth County Medical Society have been received. I am very much impressed and have taken the privilege of sending advance copies to members of our Executive Committee. I am also having two hundred copies mimeographed, with the view in mind of sending them out to some of the other state committees.
>
> "I was in Indianapolis yesterday and talked before a group of veteran medical officers. The idea of a point system as mentioned by you met with their favor . . .
>
> "It would seem wise to me that your delegates to the St. Louis meeting be pretty well informed about your thinking in this matter. If they are in sympathy with you a great deal more can be accomplished."

It is with great pride that the NORTH CAROLINA MEDICAL JOURNAL publishes the Forsyth County Medical Society's plan on page 589 of this issue, and urges that our delegates to the St. Louis convention recommend its adoption by the American Medical Association.

SOME ELECTION REFLECTIONS

Apparently President Harry Truman was the only person in the United States who was not surprised to learn that he is to be given another four-year lease on the White House and the assurance that, for two years at least, he will have a comfortable majority of Democrats in both houses of Congress. The professional prophets and interpreters of public opinion are having a hard time explaining just what took place. It is not the intention of this journal to account for the election returns, but merely to offer some random reflections as to the possible repercussions upon medical practice in this country.

First of all it is in order to pay a tribute to the courage which President Truman displayed in winning the nomination and the election. It is quite likely that admiration for his fighting qualities won a good many votes for him.

Now that the voters of the country have returned their verdict, petty partisan politics should be forgotten, until the next election, at least. There are many objectives of the present administration which every patriotic citizen can and should endorse. No man or party is infallible, however, and there is no lack of patriotism in those who oppose with all possible vigor proposed measures which they honestly believe would be detrimental to the welfare of our country. In Britain "His Majesty's Loyal Opposition" serves a very useful purpose. A loyal opposition is also needed in the United States.

It is certain that the attempt to enact some form of compulsory national health insurance will be repeated, and there is grave danger that it will succeed. For more than ten years a bill calling for some form of socialized medicine has been introduced in each successive Congress, and has always died in committee. President Roosevelt, be it remembered, never recommended compulsory sickness insurance. President Truman has repeatedly declared himself in favor of it. Therefore we need expect no let up in the efforts of federal employees to convince the people of this country that they are getting an inferior brand of medical care from a selfish, inefficient body of men—and that the proper remedy for the situation is to put the doctors under the supervision of Washington bureaucrats.

Those who do not wish to see the domination of medicine by the Federal Security Agency must prepare to oppose an all-out attempt to force a National Health Bill through Congress. In football terms, only a determined stand, possibly on the one-yard line, can prevent a victory by the proponents of socialized medicine. Let it be remembered that in 1946, 45,000 employees of the federal government gave part or all of their time and spent seventy-five million dollars for propaganda. These same federal employees will continue to have access to millions of dollars of tax money to continue their fight for government control of medicine.

In spite of the apparent odds against the private practice of medicine, the medical profession should not be overcome by a spirit of defeatism and give up the fight. There are too many reasons for encouragement. One is the phenomenal growth of the voluntary insurance plans in the United States. The greater the number of people protected by such plans, the less spontaneous pressure there will be for compulsory government insurance. There is good cause to believe that within a very short time most of the self-supporting people in the country will be protected by some form of voluntary medical care insurance. As for the indigent, no bill has yet been introduced in Congress to provide for their care by any scheme of socialized medicine.

Another reason for encouragement is the growing recognition of the general practitioner's importance to the medical profession. It was the threatened shortage of family doctors that made many laymen receptive to the idea of having a Government agency which would compel medical men to practice where and how they were ordered. With all the resources of the medical profession enlisted in maintaining a proper balance between family doctors and specialists, there is now little danger that John Q. Public will be deprived of his family medical adviser.

A somewhat indirect encouragement comes from across the water. In spite of efforts to suppress unfavorable reports, it is becoming evident that England's "noble experiment" in "nationalizing" medicine, along with railroads, banks, and coal mines, is not

too successful—even with the aid of millions of dollars from this country. It is now fairly well known also that the New Zealand trial of socialized medicine was a great disappointment to all concerned.

It is encouraging, also, to know that the overwhelming majority of doctors in the country are opposed to being regimented by the government. The results of the primary in Oregon[1] should convince anyone that doctors can exert tremendous political influence when they are aroused.

Every doctor should ask himself what he as an individual can do to prevent the tragedy of having the government take over the practice of medicine. One of the most important and effective things he can do is to tell his representative and senator how he feels about the matter. A doctor who is the personal physician of a member of Congress has an unusual opportunity for missionary work; but any doctor can write letters to his congressmen. If such letters are numerous enough, they will carry great weight.

Doctors can help by talking to their patients and friends, and giving them the truth about the matter. The gross intellectual dishonesty used in distorting the selective service rejection figures, as exposed by Dr. Maurice Freedman in the *Reader's Digest*, should be made known. The public should know of the dissatisfaction with the British National Health Insurance Plan. People should be reminded of the ineffectiveness and wastefulness of government medicine as practiced in many V.A. hospitals. They should know that if the present administration is given the chance to inaugurate a medical care plan in this country, it would be controlled by the Federal Security Agency, which in turn is dominated by a layman. Business and professional men should be reminded that socialization would not stop with medicine, but that other groups would be brought under government control, just as they have been in England.

Finally, every doctor can contribute to the National Physicians Committee, 75 East Wacker Drive, Chicago. This organization has done most effective work in the past to combat the threat of political medicine. It has the experience, the equipment, and the "know-how" to offer determined and effective resistance to the next inevitable version of the Wagner-Murray-Dingell Bill.

1. Dewey on Socialized Medicine, Editorial, North Carolina M. J. 9:356 (July) 1948.

* * * *

DR. HAMILTON McKAY—PRESIDENT-ELECT OF THE SOUTHERN MEDICAL ASSOCIATION

Just as the NORTH CAROLINA MEDICAL JOURNAL was going to press, word was received that at the recent annual session of the Southern Medical Association Dr. Hamilton McKay of Charlotte was chosen president-elect. This honor comes as no surprise to the many friends of Dr. McKay, who has long been active in the affairs of the Southern Medical Association. His professional and personal qualifications eminently fit him for this high office.

North Carolina has reason to be proud of Hamilton McKay. The NORTH CAROLINA MEDICAL JOURNAL, on behalf of the doctors of North Carolina, offers congratulations to him upon this honor, and also congratulates the delegates to the Southern Medical Association upon their good judgment in selecting him for this position of leadership. In honoring him, they have honored the medical profession of North Carolina.

* * * *

A NEW COVER FOR THE JOURNAL

For the first time since the second month of its publication, the cover design of the NORTH CAROLINA MEDICAL JOURNAL has been changed. The change was made, with some misgiving and after long deliberation on the part of the editorial board, as a concession to the constantly mounting costs of publication. Most of the cost of printing the JOURNAL is met by the revenue from advertisements. The space on the lower half of the front cover is the most desirable spot from the advertiser's viewpoint. Many other state journals have led the way in accepting advertisements for this location, and our editorial board felt that it should take advantage of the opportunity to bring a few more shekels into the treasury of the Society.

The new cover design was suggested by Mr. Bob Blake, of the Duke University Department of Medical Illustration, under the direction of Mr. Elon Clark. It is hoped that our readers will like the new cover; it is certain that our business manager will.

Clinicopathologic Conference

BOWMAN GRAY SCHOOL OF MEDICINE OF WAKE FOREST COLLEGE

A 4-year-old white boy was admitted to the hospital because of diarrhea and anemia of two months' duration.

He had never been healthy. He sat alone at 1 year of age and walked at 2 years. There was no evidence of mental retardation. He had had recurrent infections since the age of 3 months. Chronic otitis media had been present for three years, and he had had at least three attacks of pneumonia. The socioeconomic and family histories were noncontributory.

The present illness began insidiously two months prior to admission, when he had a few loose stools. An intermittent fever developed and persisted. The diarrhea gradually became more severe until the stools were almost continuous. These were said to have been loose, foul, slimy, and green in color. No blood had been noted. He became pale and lost considerable weight in spite of a fair caloric intake. Sulfadiazine and penicillin had failed to alter the number of stools, the fever, or his general condition.

Physical examination at the time of admission showed an emaciated child who was obviously seriously ill. The temperature was 101.2 F. The blood pressure was 90 systolic, 68 diastolic. The height was normal for his age, but he was 12 pounds underweight. There was a purulent discharge from the left ear. The lungs were clear. Except for tachycardia the heart was normal. The abdomen was distended and tympanitic. The spleen was not palpable. The liver was felt 3 cm. below the right costal margin. No other masses were present.

Laboratory studies revealed a severe anemia which was hypochromic and microcytic in type. There were 21,200 leukocytes, with a normal differential count. The urine was within normal limits. The total serum protein was 3.8 Gm. per 100 cc., the carbon dioxide combining power 40 volumes per cent, and the blood chlorides 504 mg. per 100 cc. The Kahn test was negative, as were three tuberculin tests.

During the first three weeks in the hospital no blood was noted in the stools, and no ova or parasites were found. Cultures revealed no pathogens. No excess fat was present, and the stools contained trypsin. Toward the end of the illness *Giardia lamblia* were found, and a paracolon bacillus and *Shigella dispar* were cultured from the stools. Barium enema examination was unsatisfactory because of the child's inability to cooperate. Proctoscopic examination showed an extensive granular lesion which was indurated, friable, and ulcerated. No amebae were found either in the stool or by direct smear from the lesion.

The course was downhill, although at one time there was slight improvement. The only additional finding was that of a mass in the right lower quadrant which varied in size from day to day. There was at no time any clear-cut abdominal tenderness. All types of therapy were tried without success. Feeding, starvation, antibiotics, and chemotherapeutic agents failed to affect the course. The fluid and electrolyte balance was maintained within normal limits by parenteral therapy. The patient gradually became weaker and died quietly five weeks after admission.

Clinical Discussion

DR. WESTON M. KELSEY: Dr. Cayer called me shortly after he had done a proctoscopic examination on this patient and told me to be certain to see the next proctoscopy, as such a lesion was most unusual. It was a remarkable sight, and I have been unable to find anything in the literature which seems to fit this history. I believe that the history of retardation since birth has little to do with this child's present illness. With this simplification, we have a child with diarrhea and an extensive rectal mass, and the problem in diagnosis could be settled if we knew which appeared first.

There seems to be considerable evidence that the mass was primary. The lesion certainly looked as if it were more than two months old, and a longer duration would fit in with the vague history of weakness prior to the onset of diarrhea. I know of no infectious disease which produces this type of lesion. Probably the most suggestive evidence is that all of the experienced proctologists who saw the lesion commented that in an adult it would be considered malignant until proven otherwise. There is some doubt as to the pathogenicity of *Giardia lamblia*, *Shigella dispar*, and the paracolon bacilli. Certainly there is no evidence that they are capable of causing a fungating mass such

as this child had. It is my impression that in a majority of cases they are probably secondary invaders in an already diseased gastrointestinal tract.

Tuberculosis could produce this lesion, but repeatedly negative tuberculin tests are strongly against this diagnosis, as is the absence of demonstrable tuberculosis elsewhere. I found two reports of chronic amebiasis in adults which produced a mass that was mistaken for carcinoma. These patients had had the disease for years. The repeated negative examinations in our patient are excellent evidence against his having amebiasis. Nothing in the laboratory findings pointed to a metabolic type of diarrhea, and these diarrheas have not been associated with gross lesions of this type.

The diagnosis would seem to be between ulcerative colitis and a neoplastic process. In the absence of a biopsy, I know of no way in which a definite diagnosis could be made. The course was more rapid than the usual one of ulcerative colitis in childhood. Certainly the extent of the local lesion is far greater than one would expect in ulcerative colitis of this duration. A brief survey of the literature on neoplastic disease of the colon and rectum in childhood surprised me. About 50 cases of such neoplasms are described. Several of these patients had illnesses similar to this child's. I remember a case presented here last year in which Hodgkin's disease produced a mass in the cecum. That child had had severe diarrhea for a month. Multiple polyposis should be mentioned, though I could find no cases in which carcinomatous degeneration occurred at this early an age.

My diagnosis when the patient was on the wards was ulcerative colitis. Primarily because the lesion looked malignant, I am going to change the diagnosis (with considerable misgiving) and guess that he had a neoplastic process of an undetermined type.

Would Dr. Cayer discuss this case?

DR. DAVID CAYER: Proctoscopic examination of this child revealed most extensive changes. The entire lumen of the bowel was diffusely involved with hyperplastic, necrotic, friable lesions in which ulcers approximately 3 to 4 cm. in length, 1 cm. in width, and 0.5 cm. in depth were seen. The lesions were covered with a mucopurulent and bloody exudate. Because of the obvious narrowing and friable condition of the bowel and the fear of perforation, no attempt was made to advance the proctoscope beyond a distance of 7 or 8 cm. It was felt at the time of the first examination that a biopsy was indicated. When a repeat proctoscopic examination was done during the next week, however, the lesion had subsided considerably. It then had the appearance of a severe ulcerative colitis rather than malignancy. It was also noted at this time that the sphincter was involved, and remained patent and atonic after the proctoscope was removed.

An attempt was made to estimate the extent of the lesion by barium enema examination, but the child was unable to retain the barium. While neoplastic growths in the rectum may be manifested by numerous bloody mucoid discharges accompanied by some fecal material, the rapid passage of food and material through the gastrointestinal tract in this child suggests an extensive involvement of the bowel. The change in the proctoscopic picture over a period of one week, as well as the fact that the lesion involved the rectal sphincter and possibly the right side of the colon, indicates that ulcerative colitis would be the most likely diagnosis. In addition, ulcerative colitis is more frequent than a primary bowel malignancy in a child. It is my impression that this represented a severe instance of extensive ulcerative colitis.

DR. KELSEY: I agree that the rapidity with which the food traversed the intestines suggests an extensive intestinal lesion. However, a relatively small or localized lesion can cause severe diarrhea in childhood.

Anatomic Discussion

DR. R. P. MOREHEAD: The findings at autopsy in this case were essentially those seen in advanced cases of chronic ulcerative colitis. The entire colon, as well as the distal portion of the ileum and rectum, was involved. The wall of the bowel was greatly thickened and indurated on its mesenteric border, and the regional lymph nodes were extensively involved. Fibrous and fibrinous adhesions were noted throughout the abdomen, and in the vicinity of the cecum adjacent loops of bowel were intimately adherent to surrounding structures. These structures, together with the greatly enlarged regional lymph nodes, made up the mass noted clinically.

Chronic ulcerative colitis is an uncommon

disease in children[1]. It does not appear to differ fundamentally, however, from the disease more frequently encountered in adults.

Provisional Anatomic Diagnoses

1. *Chronic ulcerative colitis, proctitis, and ileitis involving the entire colon and rectum, and 30 cm. of the ileum.*
2. Acute and chronic mesenteric lymphadenitis with foci of suppuration.
3. Pleural adhesions, bilateral, obliterative in type.
4. Generalized peritonitis.
5. Hydropericardium.

1. (a) Smith, R. M.: Chronic Idiopathic Ulcerative Colitis in Children, New England J. Med. 217:541-546 (Sept. 30) 1947. (b) Elitzak, J. and Widerman, A. H.: Nonspecific Ulcerative Colitis in Childhood, Am. J. Dis. Child. 62:115-126 (July) 1941. (c) Litvak, A. M. and Levy, H.: Nonspecific Ulcerative Colitis in Childhood, Arch. Pediat. 61: 293-299 (June) 1944. (d) Paulson, M.: The Present Status of Idiopathic Ulcerative Colitis, with Special Reference to Etiology, J.A.M.A. 101:1687--1694 (Nov. 25) 1933.

TUBERCULOSIS ABSTRACTS

A Review for Physicians

Issued Monthly by the National Tuberculosis Association

Vol. XXI November, 1948 No. 11

THE LAG between knowledge and practice is nowhere better illustrated than in the slowness with which general hospitals have instituted the routine chest X-ray examination of all patients at the time of admission. Yet everyone benefits when this is done—the patient, the professional staff, the hospital employees and the community.

X-RAY PROGRAMS IN GENERAL HOSPITALS

Hospitals should institute X-ray examinations of all admissions. The hospital can render this health service, which is essential for the protection of the public health, better than any other agency.

Chest X-ray surveys can be conducted in hospitals much more easily, economically, and quickly than in other groups. Hospitals also offer ideal opportunities for intensive case-finding. Most of the entering patients are free from tuberculosis, but some will have tuberculosis in its earliest stages and a few previously undiagnosed advanced cases will be found.

In 1946, more than 15,000,000 people—more than 10 per cent of the total population—spent some time as patients in hospitals. This means that a new hospital patient was admitted every two seconds. In the same year nearly 2,000,000 new citizens were born in the 7,000 hospitals of this country. Millions more are treated as outpatients in the clinics. Each patient admitted should have the benefit of a chest X-ray.

Tuberculosis is often considered a disease of youth. Contrary to this opinion, however, mortality figures in the United States show the highest death rate from tuberculosis occurring in the 70-year age group. Too few persons—even among those engaged in tuberculosis control—recognize the fact that the phenomenal decrease in the death rate among younger persons has not been accompanied by a similar decline among the aged. Yet the trend in the death rate from tuberculosis increases with each five year age group from 15 to 75. Tuberculosis among the elderly is frequently masked by the infirmities of age. It is often difficult to interest elderly people in a physical examination. These same elderly people, however, make up a large proportion of admissions to general hospitals. Here is the opportunity to begin work on the difficult and enormous problem of finding tuberculosis among the elderly.

A general hospital has three compelling reasons for taking X-rays of all patients and personnel. First, to serve its community as a case-finding center. Second, to protect its employees from the spread of tuberculosis infection by patients. Third, to protect the patients from contracting tuberculosis infection from other patients or from the personnel.

Whenever a patient with unrecognized open tuberculosis is admitted to a hospital he becomes a menace to some of the personnel in the institution. This hazard can be avoided only by routine chest X-ray examinations made on admission. Otherwise proper precautions against contagion cannot be taken.

Nurses entering training should and do have careful physical examinations and chest X-rays to assure that they are free of tuberculosis. During training, however, many contract infection from hospital patients. The only preventive for this tragic accident is admission X-raying of every patient.

With a thorough case-finding procedure among personnel and routine X-raying of all admissions there is less danger of tuberculosis infection being spread in the hospital. The danger arises within the hospital, not from accepting tuberculous patients, but from hospitalizing them with their tuberculosis unrecognized. This has been, and still is, the practice in many hospitals. When patients are known to be tuberculous, most of the acute danger of contagion can be avoided. Admission X-rays usually tell us who these patients are so that adequate isolation can be provided.

Hospital admission X-rays are a public benefit. By this means, the disease can be discovered in a population group which cannot otherwise be screened by general or industrial X-ray surveys—the mother, the housewife, the maid, the self-employed and, as pointed out before, the aged. Of the fifteen million persons entering general hospitals in 1946, two million were obstetrical patients. Women of child-bearing age have a high tuberculosis mortality and often are not included in mass X-ray examinations.

Early and accurate diagnosis of chest conditions is always an aid to the physician. Even if disease is not discovered, it guards against the dangers of incomplete diagnosis.

The program of hospital admission X-rays is approved by the American College of Radiology as a screening device; in no way does it supplant regular X-ray examinations. Chest X-rays give impetus to accurate diagnosis by the staff, interns, and house staffs and complete the hospital records of the patients admitted. The X-ray makes a graphic addition to the record; in subsequent illness it may be consulted by the family physician if he suspects aggravation of a previously existing lesion.

What We Expect from X-ray Programs in General Hospitals, F. M. Meixner, M.D., National Tuberculosis Association Transactions, 1947.

CORRESPONDENCE

October 21, 1948

To the Editor:

Enclosed is a copy of a report which was approved by the Forsyth County Medical Society at a recent meeting. I would appreciate your publishing it in the NORTH CAROLINA MEDICAL JOURNAL.

You will perceive that the committee had in mind the following ideas:

1. To keep to a minimum the number of physicians who will be required to serve in the armed forces.
2. To avoid the necessity for congressional action to get physicians into the armed forces.
3. To maintain some civilian professional control, even though indirect, over the number of physicians taken into the armed forces.
4. To provide a definite and limited term of service for medical officers.
5. To set up a point system which would require service from physicians in the following order:
   a. Those trained at government expense
   b. Those not trained at government expense who have not served before
   c. Those who have served before—first those with short terms of service, and last, those with longer terms.

Our society hopes to secure action on this report through the American Medical Association.

Sincerely yours,
L. C. OGBURN, M.D.

* * * *

FORSYTH COUNTY MEDICAL SOCIETY
MILITARY AFFAIRS COMMITTEE

Winston-Salem, N. C.
October 12, 1948

Proposed Plan for the Selection of Medical Officers for the Armed Forces

We recognize that good medical care is essential for an efficient military organization. Since we are not at war and since the armed forces are being expanded with selected men working under controllable conditions, the need for medical officers should be far less than in time of war. Every effort should be made to provide a professional work load for medical officers which would approximate that to which physicians are accustomed in civilian life. During the last war morale often suffered because of the long periods of comparative professional idleness, the uncertainties of length of service, assignment to veterans hospitals, and the use of professional personnel for administrative duties; these disturbing factors should be reduced to a minimum in the future.

The consolidation of the armed forces into a Department of National Defense is a forward step which could be made immediately applicable to the various medical corps. The consolidation of the medical services and facilities in adjacent Army, Navy, and Air Force bases, using personnel from all interchangeably and closing duplicating facilities, would liberate for other duties many physicians already in service.

Other steps of a similar nature should be taken wherever possible to utilize physicians in service at maximum professional efficiency.

We strongly oppose the use of medical officers of the armed forces to care for civilians within the United States, except in disaster. In view of the fact that the next war may very likely entail large numbers of casualties in the civilian population, provisions should be made for their care by civilian physicians, with the aid of rapidly transportable disaster units.

We recommend that the American Medical Association, through its Council on National Emergency Medical Service, take the following steps:

1. Determine that all possible procedures for the efficient use of medical personnel in the armed forces have been carried out.
2. Obtain assurance from the proper responsible officials of the armed forces that any physicians now in civilian life who may apply for a commission and/or active duty will be allowed to return to civilian life upon the completion of two years' service.
3. Through the state and county medical societies, provide for an equitable system of selecting physicians for service in the armed forces, using a point system such as the following:

SUGGESTED POINT SYSTEM:

A system similar to the one which determined release from active duty in 1945-46 should be used. Men with the lowest number of points should be the first to apply for a commission and/or active duty for two years. Points should be allowed for each year of age (5), dependent wife (50), each minor dependent (50), each month of military duty (10), and each month of foreign military duty (5). Points should be subtracted for each month of education or training of college quality at government expense during active duty (20) and subsequent to active duty (5).

EXEMPTIONS:

1. All who are physically disqualified by military standards.
2. Physicians needed in rural communities which would be left without adequate medical care.
3. All whose nearest birthday is 45 or over.
4. Heads of departments of medical schools.
5. Interns until the completion of their regular internship.
6. Residents until the completion of the year of residency which they were serving when they became eligible for military service.

SUGGESTED PROCEDURE:

1. The attached form ("Questionnaire for Physicians (M.D.)") would be reproduced locally.
2. One copy would be completed by each physician under 45 years of age in civil life in the United States and filed with his own or nearest county medical society. It would be the responsibility of each county medical society to secure a complete questionnaire from each physician in its area. It would be the responsibility of each physician to keep his questionnaire current.
3. Each county medical society would compile a

tally sheet listing the net-point numbers given on its questionnaires and indicating the number of non-exempt physicians with each listed net-point number. This list would be kept current and a copy sent to the state medical society headquarters on request.

4. Each state medical society would compile a complete list, keep it current, and forward a copy to the American Medical Association on request.

5. The American Medical Association would determine the number of eligible physicians in each net-point category, and the net-point number below which all non-exempt physicians would be requested to apply for commissions and/or active duty for two years in order to furnish the necessary number for the armed forces.

J. P. Davis, M.D.
G. T. Harrell, Jr., M.D.
R. E. Hedrick, M.D.
Felda Hightower, M.D.
H. C. McDowell, M.D.
C. R. Welfare, M.D.
L. C. Ogburn, M.D.,
Chairman

Questionnaire for Physicians (M.D.)

1. Name: ..... , ... (last, first, middle)

2. Address: ..... (street) Phone: ..... (office)

..... (city and state) ..... (home)

3. Graduate ..... (medical school) ..... (year)

4. Interned ..... (hospital) from ..... to .....

5. Licensed ..... (state) ..... (year) Specialty ..... (If not full time, write "None")

Points to be Allowed:

6. Age in years to nearest birthday . . . . × 5 .....
(If 45 or more, do not finish questionnaire)

7. Married and living with wife? ..... If "Yes" place figure "50" in right-hand column . . . .

8. Number of minor dependents . . . . × 50 .....

9. Number of months of active military duty . . .. × 10 .....
(As Enlisted Man, ASTP, V-12, Officer. Sixteen or more odd days count as a whole month)

10. Number of months of foreign military duty . ..... × 5 .....

11. Sum of lines 6, 7, 8, 9, and 10 . . . .

Points to be Deducted:

12. Number of months in school or training of college quality or better while on active duty . ..... × 20 .....

13. Number of months of school or training at government expense since release from active duty . ..... × 5 .....

14. Sum of points entered under items 12 and 13 . .....

15. Subtract line 14 from line 11 . . . . . NET POINTS .....

Do you know of any reason why you would not be acceptable as a medical officer in one of the armed forces?

Do you know of any reason why you should not apply for a commission and two years of active duty as a medical officer in the armed forces if, in view of the information above and in the opinion of the Council on National Emergency Medical Service, it should seem just and proper that you do so?

I declare that the information given above is correct.

Date ....
Signature

BULLETIN BOARD

McCain Memorial Committee

At a recent meeting of the McCain Memorial Committee it was decided to have the unveiling and edication of the portrait of Dr. Paul McCain at the State Sanatorium on December 7 at 2 p.m. The entire membership of the State Medical Society is invited to attend. The McCain Memorial Committee is composed of Dr. Paul F. Whitaker of Kinston, chairman; Dr. Frederic C. Hubbard of North Wilkesboro; and Dr. William M. Coppridge of Durham.

State Board of Medical Examiners

The North Carolina Board of Medical Examiners will meet at the Sir Walter Hotel, Raleigh, on Monday, January 17, 1949, at 10 a.m., for the purpose of interviewing candidates for licensure by endorsement.

Dr. T. Leslie Lee of Kinston has been elected president for the next year, succeeding Dr. M. A. Pittman of Wilson.

North Carolina Surgical Association

A new organization, the North Carolina Surgical Association, has recently been formed to further surgery in North Carolina. Officers of the Association are Dr. James F. Marshall, Winston-Salem, president; Dr. George T. Wood, High Point, vice president; and Dr. Alexander Webb, Jr., Raleigh, secretary-treasurer.

College of American Pathologists

The Southeastern Region of the College of American Pathologists will meet in Charlotte on December 10 and 11. The program is as follows:

Friday, December 10

9:30 a.m. Slide seminar, led by Dr. Tracy Mallory, pathologist, Massachusetts General Hospital.

1:30 p.m. "Splenic Anemias"—Dr. Robert Heinle, associate professor of medicine, Western Reserve University School of Medicine, Cleveland, Ohio.

2:45 p.m. "Cytological Cancer Diagnosis by Smear Method"—Dr. N. Chandler Foot, professor emeritus of surgical pathology, Cornell University; with scheduled discussion by J. A. Cunningham, M.D. and L. C. Posey, M.D., Birmingham, Alabama, and E. R. Pund, M.D., University of Georgia School of Medicine, Augusta, Georgia.

7:00 p.m. Banquet. Dinner speaker, Dr. M. G. Westmoreland, Executive Secretary, College of American Pathologists. Informal discussion after dinner on "Bone Marrow Studies," led by Dr. Heinle.

Saturday, December 11

9:30 a.m. "Lower Nephron Nephrosis"—Dr. Tracy Mallory.

10:30 a.m. Series of papers presented by members of the College.

1:30 p.m. Tour through the hospital laboratories.

The scientific meetings will be held in the Charlotte Memorial Hospital. Pathologists, regardless of membership in the College of American Pathologists, are invited.

North Carolina Public Health Association

The thirty-seventh annual session of the North Carolina Public Health Association was held October 18-20 in Durham. Among those participating in the program were Drs. J. H. Epperson and Robert A. Ross of Durham, Drs. Edward G. McGavran and O. David Garvin of Chapel Hill, Drs. H. C. Whims and E. D. Peasley of Asheville, Dr. E. H. Ellinwood of Newton, Drs. James F. Robertson and Donald B. Koonce of Wilmington, Dr. C. W. Bailey of Rocky Mount, Drs. J. W. R. Norton and Ivan Procter of Raleigh, Dr. Roscoe D. McMillan of Red Springs, Dr. E. S. Grady of Smithfield, Dr. C. F. McRae of Burnsville, Dr. R. M. Buie of Greensboro, Dr. J. Roy Hege of Concord, Dr. M. B. H. Michal of Waynesville, Drs. James F. Marshall and Wingate M. Johnson of Winston-Salem, and Dr. Fred Hubbard of North Wilkesboro.

Officers of the Association for 1947-48 were Dr. H. W. Stevens of Wilson, president; Dr. E. A. Branch of Raleigh, vice president, and Harold Parker of Winston-Salem, secretary-treasurer.

Seminar on Industrial Medicine and Surgery

A seminar on industrial medicine and surgery was held at the Hotel Sir Walter in Raleigh, November 9 and 10. This was the fourteenth in a series of industrial medical seminars sponsored by the American Mutual Liability Insurance Co., for the purpose of disseminating information on advanced practices in the care and treatment of occupational diseases and injuries.

Among those taking part in the program were Drs. Barnes Woodhall, R. Beverly Raney, and Lenox D. Baker of Durham; Dr. Hugh A. Thompson of Raleigh; Dr. Malory A. Pittman of Wilson; and Dr. William M. Roberts of Gastonia.

News Notes from the North Carolina Tuberculosis Association

At a recent meeting of the Executive Committee of the N. C. Tuberculosis Association, it was announced that the North Carolina Trudeau Society has been approved by the American Trudeau Society and that a constitution has been adopted. All members of the American Trudeau Society residing in North Carolina are invited to join.

* * * *

Dr. C. Sylvester Green, editor of the **Durham Morning Herald,** has been appointed state director of the forty-second annual Seal Sale.

* * * *

Representatives from North Carolina at the Southern Tuberculosis Conference, held in Savannah, Georgia, September 29-October 1, included Dr. M. D. Bonner of Jamestown, Dr. P. A. Yoder of Winston-Salem, Dr. H. L. Seay of Huntersville, Dr. D. T. Smith of Durham, Dr. H. F. Easom of Wilson, Dr. H. S. Willis of McCain, Dr. C. D. Thomas of Black Mountain, Dr. R. B. C. Franklin of Mt. Airy, Dr. C. G. Milham of Hamlet, and Dr. Anderson of Asheville.

Mr. Frank W. Webster of Raleigh, executive secretary of the N. C. Tuberculosis Association, was elected secretary-treasurer of the conference, and Dr. H. S. Willis of McCain was named to the board of directors.

News Notes from the Duke University School of Medicine

Dr. Lenox D. Baker, professor of orthopaedic surgery, has recently returned from a seven-week trip to Far East medical installations as orthopaedic consultant for the Surgeon General's Office of the Department of the Army. His mission was "to promote and improve the quality of medical care and instruction in medical installations in the Far East command."

News Notes from the Bowman Gray School of Medicine of Wake Forest College

Ray E. Brown, superintendent of the University of Chicago Clinics, Chicago, Illinois, and former administrator of the North Carolina Baptist Hospital, spoke to the Bowman Gray Medical Society at its meeting on October 25. His subject was "Economics of Medical Care."

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Dr. Frank R. Lock, head of the department of obstetrics and gynecology, was one of the speakers at sessions of the Oklahoma Postgraduate Conference in Oklahoma City, October 24-28.

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Dr. Fred K. Garvey, director of the department of urology, was elected president of the North Carolina Urological Association during the annual meeting of the association, held at Southern Pines, October 17-18. Dr. Charles M. Norfleet, instructor in urology, was one of the speakers at the meeting.

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Dr. J. Maxwell Little, associate professor of physiology and pharmacology, took part in round-table discussions on the subject of poliomyelitis research at a conference in Madison, Wisconsin, October 25-27.

The conference was sponsored jointly by the department of medical microbiology of the University of Wisconsin and the National Foundation for Infantile Paralysis. Dr. Little reported on progress being made here in the research project attempting to grow the virus of polio in embryonated eggs.

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Dr. Wingate M. Johnson, professor of clinical medicine, spoke to the section on general practice of the Indiana State Medical Association and to the Indiana Academy of General Practice in Indianapolis on October 27.

* * * *

An exhibit by Dr. David Cayer on "Vitamin Requirements in Health and Disease" won honorable mention at the meeting of the Southern Medical Association.

Eighth District Medical Society

The Eighth District Medical Society met in High Point on October 27. Speakers on the afternoon program were Dr. C. C. Carpenter of Winston-Salem, Drs. Max P. Rogers and E. D. Jones of High Point, and Dr. James E. Best of Greensboro. The papers were discussed by Drs. James F. Donnelly, Francis Forsyth, and J. P. Rousseau of Winston-Salem, and by Dr. Maurice LeBauer of Greensboro. Senator George Penny of Greensboro spoke at the evening meeting.

Officers of the Society are Dr. K. B. Geddie, president; Dr. A. R. Cross, secretary-treasurer; and Dr. C. L. Gray, vice president.

Tenth District Medical Society

The fall meeting of the Tenth District Medical Society was held in Murphy on October 13. At the afternoon session scientific papers were presented by Dr. W. A. Hoover of Murphy and Drs. Stanley S. Atkins, Richard C. Nailling, and Lillie C. Walker of Asheville, and discussed by Drs. Julian A. Moore, James Cherry, E. D. Peasley, and Bernard H. Hartman. Dr. V. H. Duckett of Canton gave the president's address, and the councilor of the district, Dr. D. M. McIntosh of Old Fort, gave a report. Dr. Hugh A. Matthews of Canton responded to the address of welcome.

Dr. David F. James, assistant professor of medicine at Emory University, was guest speaker at the dinner meeting. His subject was "The Differential Diagnosis of Medical and Surgical Jaundice."

Officers elected for the coming year were Dr. W. A. Hoover of Murphy, president; Dr. Julius Sader of Brevard, vice president; Dr. Otis Duck of Mars Hill, second vice president; and Dr. Paul McBee of Marion, third vice president. Dr. Joseph T. Sullivan of Asheville was re-elected secretary-treasurer. Retiring officers were Dr. V. H. Duckett of Canton, Dr. Joseph Osborne of Rosman, Dr. W. N. Fortescue of Hendersonville, Dr. Candler A. Willis of Candler, and Dr. B. W. Whitfield of Murphy.

Carteret County Medical Society

The regular monthly supper meeting of the Carteret County Medical Society was held in the Morehead City Hospital, October 11, the hospital acting as host.

The scientific program consisted of a lecture on bronchoscopy by Dr. J. C. Peele of Kinston.

Other guests at the meeting were Dr. P. T. Myers, roentgenologist, Dr. Dan Boyette, pediatrician, and Dr. Dalton, ophthalmologist, all of Kinston. Dr. J. W. Morris is president of the society, and Dr. F. E. Hyde secretary.

Reported by
N. Thomas Ennett, M.D.
Carteret County Health Officer

Edgecombe-Nash Counties Medical Society

Dr. Richard B. Jackson of Raleigh discussed "Some of the Common Surgical Aspects of Proctology" before the Edgecombe-Nash Counties Medical Society at its meeting in Rocky Mount on October 13. Drs. Glenn Phipps and Wardell Mills of Rocky Mount, associates of Dr. C. W. Bailey, were elected to membership in the society.

Forsyth County Medical Society

A dinner meeting of the Forsyth County Medical Society was held on October 12 in Winston-Salem. Dr. Arthur Merrill spoke on "Heart Failure and the Use of Diuretics."

Halifax County Medical Society

The regular monthly meeting of the Halifax County Medical Society was held in Roanoke Rapids on October 8. The speaker was Dr. Everett I. Bugg, Jr., of Durham, whose subject was "Orthopedics."

News Notes

Dr. Aldert S. Root of Raleigh has been appointed by Governor Cherry to succeed the late Dr. Frank Sharpe of Greensboro as a member of the North Carolina Milk Commission.

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Dr. William B. Alsup has opened an office in Winston-Salem for the practice of otolaryngology.

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Dr. E. Reid Bahnson has announced the opening of offices on November 1 for the practice of internal medicine in Winston-Salem.

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Dr. Ruth O'Neal has announced the opening of her office in Winston-Salem. Her practice will be limited to pediatrics.

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Dr. Henry L. Valk has recently announced the opening of offices for the practice of internal medicine in Winston-Salem.

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Among the participants in the Miami meeting of the Southern Medical Association were the following physicians from North Carolina: Dr. David Cayer of Winston-Salem, who presented a scientific exhibit and a paper before the Section on Gastroenterology; Dr. Fred Garvey of Winston-Salem, who presented three motion pictures on urologic surgery; Drs. Keith Grimson, Sam McPherson, William M. Nicholson, Walter Spaeth, Arthur H. London, Jr., George J. Race, Bernard Black-Schaffer, George Baylin, Robert J. Reeves, Barnes Woodhall, and Joseph E. Markee of Durham, Drs. George T. Harrell, Manson Meads and W. Eugene Cornatzer of Winston-Salem, Drs. Walter R. Johnson and George D. Wilson of Asheville, Dr. Daniel Boyette of Kinston, Dr. Robert E. Fox of Albemarle, and Dr. J. W. R. Norton of Raleigh, all of whom presented papers before the various section meetings; and Drs. Julian Ruffin, J. L. Callaway, Robert N. Creadick and Bayard Carter of Durham, Drs. Paul Kimmelstiel and Oren Moore of Charlotte, and Dr. Hampton Mauzy of Winston-Salem, all of whom discussed papers.

North Carolina doctors who served as officers of sections were Drs. William M. Nicholson, Cyrus C. Erickson, and Walter L. Thomas of Durham, Drs. Walter R. Johnson and George D. Wilson of Asheville, Dr. Samuel F. Ravenel of Greensboro, Dr. Joseph M. Hitch of Raleigh, Dr. W. M. Roberts of Gastonia, Dr. Williamson Z. Bradford of Charlotte, and Dr. Robert E. Fox of Albemarle.

Dr. Arthur H. London, Jr., of Durham, was chairman of the Committee on Scientific Awards of the Southern Medical Association.

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The following North Carolina physicians registered at the Southern Medical Association meeting, held in Miami, October 25-27:

H. H. Baird, Charlotte
T. W. Baker, Charlotte
W. E. Baldwin, Jr., Whiteville
S. W. Barefoot, Greensboro
G. J. Baylin, Durham
J. R. Bender, Winston-Salem
B. Black-Schaffer, Durham
F. C. Bore, Durham
W. Z. Bradford, Charlotte
D. T. Bridges, Lattimore
H. L. Brockmann, High Point
E. B. Brooks, Winston-Salem
J. L. Callaway, Durham
David Cayer, Winston-Salem
J. W. Clower, Jr., Durham
J. J. Combs, Raleigh
R. N. Creadick, Durham
C. S. Drummond, Winston-Salem
J. C. Elliott, Oxford
C. C. Erickson, Durham
R. E. Fox, Albemarle
E. W. Franklin, Jr., Charlotte
W. L. Grantham, Asheville
K. S. Grimson, Durham
G. T. Harrell, Winston-Salem
J. P. Hendrix, Durham
E. R. Hipp, Charlotte
J. M. Hitch, Raleigh
F. M. Houser, Cherryville
S. S. Hutchinson, Bladenboro
J. E. Jacobs, Charlotte
W. R. Johnson, Asheville
Grace P. Kerby, Durham
Herbert Kerman, Durham
H. B. Kernodle, Burlington
W. L. Kirby, Winston-Salem
A. H. London, Durham
W. M. Long, Mocksville
C. C. Massey, Charlotte
C. H. Mauzy, Winston-Salem
S. D. McPherson, Jr., Durham
C. G. Milham, Hamlet
J. W. Morris, Morehead City
K. E. Neese, Monroe
W. W. Noel, Henderson
J. W. R. Norton, Raleigh
A. L. O'Briant, Raeford
E. S. Orgain, Durham
D. R. Perry, Durham
E. N. Phillips, North Wilkesboro
P. H. Ringer, Asheville
W. E. Selby, Charlotte
W. L. Thomas, Durham
R. M. Troxler, Burlington
Lillie C. Walker, Asheville

Corrections for the Directory

The following corrections should be made in the alphabetical list of fellows of the Medical Society and in the roster by counties:

Dr. William R. Brandon of Statesville—Specialty should be ALR rather than OALR.

Dr. William Davis, Jr., of Elizabeth City—Specialty should be Pd rather than GP.

Dr. John C. Grier has moved from West End to Pinehurst. His specialty should be GP rather than P.

Dr. W. M. Long of Mocksville—Specialty should be GP rather than S.

Dr. Roy M. Peacock of Asheville—Specialty should be GP & S rather than GP.

Dr. J. C. Peele of Kinston—Specialty not listed; should be ALR. Year of graduation should be 1937 rather than 1936.

Dr. George H. Wadsworth has moved from Elizabeth City to Ahoskie. His specialty should be S rather than GP.

Dr. L. L. Wilkinson of High Point — Specialty should be S rather than GP.

(BULLETIN BOARD CONTINUED ON PAGE 598)

A POOR POINT OF VIEW!

. . . With so much going on in the world it's a shame to emulate the traditional position of the ostrich . . .

. . . Busy physicians, with heavy working schedules, often are tempted to "get away from it all" by laying aside their professional journals and relaxing with the latest "who dunit" murder mystery . . .

. . . Relaxation is fine, but too much is happening in the world of medical science and medical economics to remain out of professional circulation for more than a short time . . .

. . . The Journal gives you the latest information on scientific matters, news of the profession, and also what is new in drugs, medical appliances, and special services. Don't overlook the educational value of the ads. You can trust their reliability, for only products accepted by A. M. A. councils are advertised . . . Most offer samples.* Write for them and in that way help us prove the point we often make, that . . . "North Carolina physicians read their state medical journal."

THE NORTH CAROLINA MEDICAL JOURNAL

* See Page XXXIX for Current Advertisers.

AUXILIARY

REPORT OF BOARD MEETING

The annual meeting of the Board of Directors of the Auxiliary to the Medical Society of the State of North Carolina was held at McCain on Tuesday, October 5, at 11 a.m. The members were guests of Dr. and Mrs. H. S. Willis. The president, Mrs. Raymond Thompson of Charlotte, presided over the meeting. Forty members were present.

After the invocation, given by Mrs. Charles L. Nance, the president brought greetings to the Board. Mrs. H. S. Willis extended a cordial welcome to the members. Brief reports, plans, and suggestions were heard from the president-elect, Mrs. Thomas L. Lee, and from the treasurer, Mrs. E. C. Judd. It was announced that the national dues are $1.00 and the state dues $1.00. Fifty cents of the state dues goes to expenses and fifty cents to the Sanatoria fund. Mrs. P. P. McCain, chairman of past presidents, and Mrs. David Cayer, recording secretary, were unable to be present.

The first vice president, Mrs. Reece Berryhill, chairman of organization, introduced the district councilors, and short reports were given by each.

First District—Mrs. J. E. Smith, Windsor
Second District—Mrs. Ben F. Royal, Morehead City
Third District—Mrs. E. C. Anderson, Wilmington
Fourth District—Mrs. J. W. Rose, Pikeville
Fifth District—Mrs. H. S. Willis, McCain
Sixth District—Mrs. W. C. Ward, Raleigh
Seventh District—Mrs. Charles L. Nance, Charlotte
Eighth District—Mrs. C. V. Tyner, Leaksville
Ninth District—Mrs. J. S. Holbrook, Statesville
Tenth District—Mrs. Charles D. Thomas, Black Mountain

Mrs. M. D. Hill, second vice-president and chairman of Sanatoria beds, gave her report and introduced her chairmen:

McCain Bed Chairman—Mrs. John H. Hamilton, Raleigh
Stevens Bed Chairman—Mrs. G. M. Billings, Morganton
Cooper Bed Chairman—Mrs. M. I. Fleming, Rocky Mount

Dr. Rachel Davis, chairman of the Advisory Board, gave her report.

After lunch Dr. Roscoe McMillan, secretary-treasurer of the Medical Society, was introduced. Dr. McMillan spoke of some of the problems of the medical profession. He announced that plans are being made to celebrate the one hundredth anniversary of the Medical Society of the State of North Carolina in May, 1949, at Pinehurst, and urged a large attendance.

Dr. J. F. Robertson, president of the Medical Society, brought greetings to the Board.

Committee reports and plans were given briefly by the following chairmen:

Program Chairman—Mrs. Harry Johnson, Elkin
Public Relations Chairman—Mrs. Milton Clark, Goldsboro
Research Chairman—Mrs. Roland S. Clinton, Gastonia
Press and Publicity Chairman—Mrs. John P. Kennedy, Charlotte
Hygeia Chairman—Mrs. C. S. Barker, New Bern
Bulletin Chairman—Mrs. Walter Summerville, Charlotte
Scrapbook Chairman—Mrs. Stuart Gibbs, Rocky Mount
Memorial Chairman—Mrs. H. H. Foster, Norlina
Nominations Chairman—Mrs. Ben Kendall, Shelby
Revisions Chairman—Mrs. Robert T. Pigford, Wilmington
Legislative Chairman—Mrs. C. P. Eldridge, Raleigh
Historian—Mrs. Roscoe McMillan, Red Springs

MRS. JOHN P. KENNEDY, Charlotte
Chairman Press and Publicity

Sick Children

Sick children present a two-fold problem in respect to growth and maintenance of body tissue: (1) repair of the damage wrought by disease, and (2) provision of the nitrogen needed for the growth processes, which persist in their demands during periods of illness. Hence, the physician may wish to prescribe large amounts of protein. Protenum is a highly palatable high protein food—low in fat. In the form of a beverage or in various recipes, Protenum will increase the protein intake without adding appreciable bulk to the diet. For literature and professional samples of Protenum, write Mead Johnson & Co., Evansville 21, Indiana.

BOOK REVIEWS

Headache and Other Head Pain. By Harold Wolff. 642 pages. Price, $12.00. New York and London: Oxford University Press, 1948.

This excellent and comprehensive book is based upon a thorough review of the literature, integrated with the extensive work of the author and his collaborators performed over the past fifteen years. It provides both a critical analysis of the present knowledge of headache mechanisms and practical points in the diagnosis and treatment of head pains.

Represented are chapters on headache associated with intracranial pressure, brain tumor, subarachnoid hemorrhage, fatigue, the nose and paranasal sinuses, the eyes, the muscles of the back of the neck, and a detailed discussion of the migraine syndrome. Each chapter discusses its topic in great detail, giving references to the current literature, and closes with a summary for those desiring to digest the material quickly. In the last chapter, a complete summary of the entire book is given. Extensive use is made of material in diagrammatic form, 154 figures being used.

The book is highly recommended, both for the individual occasionally interested in headache and for those to whom headache problems are a daily occurrence. It is an excellent source book for the internist, the neurologist and neurosurgeon, the general practitioner, the instructor, and the medical student.

Occupational Marks and Other Physical Signs; A Guide to Personal Identification. By Francesco Ronchese, M.D., Instructor in Dermatology, Boston University School of Medicine, and Dermatologist in Chief, Rhode Island Hospital, Providence. 181 pages. Price, $5.50. New York: Grune and Stratton, 1948.

This unusual monograph undertakes to list and describe the various specific occupational marks, such as calluses, scars, pigmentation, and tattoos. An impressively long list of occupations that may produce characteristic identifying marks is described, although the author points out that the absence of such marks is of no diagnostic value because of the increasing use of protective devices against trauma and the continuing introduction of labor-saving machinery. The writer's description of these marks, how they are acquired, and the possible usages to which such information may be put is an unusual and interesting story. The photographs of the lesions, usually accompanied by a diagram of their method of acquisition, are excellent and occupy 107 pages. The work is well documented, twelve pages of references being given, and the index is adequate. This book should prove to be of interest to criminologists as well as physicians.

A Manual of Pharmacology—And Its Application to Therapeutics and Toxicology. By Torald Sollmann, M.D., Professor Emeritus of Pharmacology and Materia Medica in the School of Medicine of Western Reserve University, Cleveland. Ed. 7. 1132 pages. Price, $11.50. Philadelphia and London: W. B. Saunders Company, 1948.

This book, which had its origin in 1917, has remained a standard reference book on pharmacology since its initial publication. Remarkable in its completeness of coverage, it has been kept strictly up-to-date and contains extensive discussions of such topics as the sulfonamides, para-amino benzoic acid, the histamine antagonists, the antithyroid drugs, and digitoxin.

To the already voluminous references present in previous editions, many recent publications have been added. The organization continues to be by drug groups rather than by systemic action. The use of a double column format has improved the ease of reading. The use of large type for the more important passages is continued in this edition.

The book is highly recommended as a reference text for the internist, the general practitioner, and the medical student.

Textbook of Gynecology. By Emil Novak, M.D., F.A.C.S., Assistant Professor of Gynecology, The Johns Hopkins Medical School; Gynecologist, Bon Secours and St. Agnes Hospitals, Baltimore. Ed. 3. 742 pages, with 484 illustrations. Price, $8.00. Baltimore: Williams & Wilkins Co., 1948.

The third edition of Dr. Novak's text is a comprehensive review of the field of gynecology. This book has rapidly been accepted as the leading textbook of gynecology. The first two editions were excellent, and there are several features of the third edition which make it an even finer text. Especially commendable is the considerable number of illustrations in full color plates. Most of the important gynecologic lesions are included in this series of pictures. A great many black and white figures and diagrams are also included. The subjects which were photographed are well chosen to illustrate clearly the descriptive material of the text.

Dr. Novak is one of the leading medical authors of our generation. He writes clearly and concisely, and his recommendations for the treatment of each lesion are specific enough to make his text a ready reference book for the office practice of gynecology. Excellent special sections on subjects such as leukorrhea, backache in women, and problems of sex life are particularly useful.

It is the opinion of the reviewer that this is the best textbook of gynecology available for the student and general practitioner. It is recommended without reservation.

Biology of Disease. By Eli Moschcowitz, M.D., Physician, Mt. Sinai Hospital, New York; formerly Assistant Professor, Clinical Medicine, Columbia University. 221 pages. Price, $4.50. New York: Grune and Stratton, 1948.

In this book the author has presented his ideas as to the evolution of hypertension of the pulmonary circuit, hypertension of the greater circulation, arteriosclerosis, periarteritis nodosa, Libman-Sacks disease, polycythemia vera, leukemia, follicular lymphoblastoma, myeloma, Graves' disease, neurocirculatory asthenia, toxic hepatitis, Laennec or portal cirrhosis, glomerulonephritis, obesity, peptic ulcer, achlorhydria in relation to anemia, cardiospasm, sprue syndrome, emphysema, psychosomatic problems, uremia, nephrosis and the hyperkinetic diseases.

The pathologic effects of these disease processes are only partly discussed. In this short resume there is very little experimental evidence for the etiology of these disease processes.

Case Studies in the Psychopathology of Crime. Vol. 3 and Vol. 4. By Ben Karpman, M.D., Senior Medical Officer and Psychotherapist, St. Elizabeth's Hospital, Washington, D. C. Vol. 3: 834 pages. Vol. 4: 875 pages. Washington, D. C.: Medical Science Press, 1948.

Previous volumes of this work have been reviewed in this journal (6:113 (Feb.) 1945 and 8:609 (Sept.) 1947), and the two present volumes continue the plan previously established. Each of the present volumes consists of four detailed and very intensive case studies, containing material ranging from autobiographical information written by the patient to detailed accounts of dreams. Although the approach is primarily analytic, the author makes very little attempt to interpret any of the voluminous information offered concerning each patient. Case history information that is as complete as possible is recorded, and the reader is left to draw his own conclusions and formulate his own theories concerning the psychiatric factors leading to the patient's crimes.

These volumes could be a very valuable source of material for persons interested in research in this field. Each volume is a self-contained unit, with full preface and index, and with no cross-references from volume to volume. This work will be useful only to those having a "direct professional interest in medico-legal and social problems," and a notation inside the cover states that sale is restricted to persons in this category.

Pioneer Life in Kentucky. By Daniel Drake, M.D. Edited, from the original manuscript, with introductory comments and a biographical sketch by Emmet Field Horine, M.D. Price, $4.00. 257 pages. New York: Henry Schuman, 1948.

Pioneer Life in Kentucky "consists of a series of 'reminiscential' letters written by Dr. Daniel Drake in response to the urgent requests of his children for a family record . . . This book, although written by the most eminent early nineteenth century physician of the Central West, is not a medical treatise. It is an intimate and detailed portrayal of farm and family life in a fascinating and significant period of the United States."

In a biographical sketch by Dr. Emmet Field Horine, Dr. Drake is pictured as being a physician, man of letters, naturalist, philosopher, and teacher. He was the first student of medicine in Cincinnati and later acquired a large practice there. Instrumental in establishing the Cincinnati College, he later founded the Medical College of Ohio and served on the faculty there and at other prominent medical schools. As author and editor, he made many contributions to medical literature and to the field of natural history.

These letters were published first in 1870 and reprinted in 1907; however, in the present edition, the editor has turned to the original manuscripts for the sake of accuracy.

Pioneer Life in Kentucky has been recommended for boys and girls of the high school age, but it is also worthy of a place in any medical school library.

In Memoriam

MONTGOMERY H. BIGGS, M.D.

Dr. Montgomery Herman Biggs, for forty-two years a member of the staff of the Rutherford Hospital, died on August 28, after an illness of several weeks. In his death the staff and trustees of the hospital lost a distinguished associate and a valued friend.

Born in Hinsdale, Illinois, on May 14, 1870, Dr. Biggs graduated in medicine from the University of Pennsylvania in 1897. He served an internship at the University Hospital and then was appointed resident physician at the Philadelphia General Hospital. In 1906, after gaining experience and attaining high qualifications as a surgeon, Dr. Biggs came to Rutherfordton and was associated with Dr. Henry Norris in founding the Rutherford Hospital, with which he was connected for the remainder of his life. So thorough was the work of Dr. Biggs as a physician, surgeon, hospital administrator, and educator that his influence reached into homes in every section of the county. Being a man of the highest probity, whose life was devoted unsparingly to the service of his fellow man, he was a source of inspiration to his medical colleagues and his passing leaves them with a sense of deep bereavement.

During the last few years of his life, in spite of ill health, Dr. Biggs gave his time and energy to planning for an enlargement of the hospital and its facilities.

At a meeting held on October 7, the trustees of the Rutherford Hospital, as an expression of appreciation of Dr. Biggs's services, incorporated in the records the following resolution:

"**Resolved,** that the Board of Trustees record its deep sorrow at the loss of Dr. Montgomery H. Biggs, colleague and friend. Through his work and by his spirit and personality he endeared himself to all his co-workers, who had come to feel for him equally admiration, respect, and love. It can well be said of Dr. Biggs that he brought relief from suffering and the restoration of health to large numbers of our people and was influential in making our county a better place in which to live."

BULLETIN BOARD

(CONTINUED FROM PAGE 593)

Diabetes Detection Drive

The finding of the million unknown diabetics in this country poses a direct challenge to the American doctor. It is within his power to accomplish this feat. The existence of a million undiscovered diabetic patients in the United States has been demonstrated through a series of surveys, the most recent one conducted by the United States Public Health Service. The results of these studies now provide a springboard for organized medicine and a golden opportunity for physicians to seize the initiative on their own in this significant phase of public health.

The American Diabetes Association has planned a campaign to promote the early discovery and prompt treatment of the million undiscovered cases of diabetes. This campaign is unique in professional service, for according to plan the physician himself will be at the helm. Therefore, the plan cannot be prosecuted, or even started, without the endorsement and support of the entire medical profession through its governing bodies, national, state, county and local medical societies.

The plan proposed by the Association is simple, direct, and sure. Through local diabetes associations, related to the American Diabetes Association and with cooperation of local, county and state medical societies over the United States and Canada, it is planned to carry out blood-sugar screening tests by a new five-minute micro-blood sugar method with simultaneous urinalysis for sugar with attention to the time in relation to the preceding meal. The procedure can be carried out apart from a formal laboratory. The equipment is still in the manufacturer's hands but is to be available within two or three months. The only provision will be that the candidate must name a physician or clinic to which the results of the tests will be mailed for interpretation to the patient. **Under no condition** will a report be sent directly to the examinee. The effort is to bring the unknown diabetic patient under his own physician's care. There will be no statistics; no red tape.

Simultaneously, the American Diabetes Association will carry on an intensive educational campaign directed first toward doctors' postgraduate courses. It will be directed toward the layman by radio, newspapers and other publicity channels in addition to the "A.D.A. Forecast," the Association's bimonthly magazine which brings to the diabetic patient homespun articles on the disease by eminent authorities in the field. At the same time the Association will place in the hands of physicians over the country an authentic "Handbook of Therapy." Containing the most up-to-date information available, the Handbook will assist the physician in treating diabetic patients.

The week of December 6-12, immediately following the interim meeting of the American Medical Association, will be proclaimed as "Diabetes Week." This will be the formal beginning, the kick-off, of the Association's Diabetes Detection Drive. From this start, the program will continue on a long-term basis.

The 1947 death rate from tuberculosis in North Carolina was 28.4, and there were 1056 deaths from the disease during that year.

American Medical Writers' Association

At the fifth annual meeting of the Mississippi Valley Medical Editors' Association, held at Springfield, Illinois, September 29, radical changes were voted in the Association's constitution, including the adoption of a new organization name—"The American Medical Writers' Association." The new name more clearly expresses the purpose and scope of the organization. The purpose is defined as: "(a) to bring into one organization all physicians interested in medical journalism or medical writing, and all laymen who are connected with the editorial or business staff of medical periodicals, libraries, foundations, or publishing companies; (b) to help improve medical literature; (c) to secure interchange of views of the members so that they may attain such intelligent unity and harmony in every phase of their labor as will elevate and make effective the opinions of the medical profession in their respective communities."

The officers for 1949 are: President, E. F. Parker, M.D., Moline, Ill.; president-elect, K. H. Schnepp, M.D., Springfield, Ill.; vice-president, Julius Jensen, M.D., St. Louis; secretary-treasurer, Harold Swanberg, M.D., Quincy, Ill. All interested in medical writing are cordially invited to join. Membership application blanks may be secured from Harold Swanberg, M.D., Secretary, 209-224 W.C.U. Bldg., Quincy, Ill.

Excerpta Medica

A comprehensive international abstracting service published in English.

In April, 1947, after a year's intensive preparation, the first of the fifteen monthly sectional journals comprising **Excerpta Medica** made its appearance in the medical world. The final section was published in July, 1948, and all sections are now appearing regularly every month.

Excerpta Medica has now been officially recognized as the only international medical abstracting service at present in existence which covers all the clinical and experimental fields of medicine. The Williams & Wilkins Company is sole agent for **Excerpta Medica** in the United States, Canada, and Central America.

Federal Security Agency

Deaths in Each State, 1947

A total of 1,445,370 deaths was registered in the United States during 1947, according to figures released by the National Office of Vital Statistics, in the Public Health Service, Federal Security Agency. This represents an increase of 49,753 deaths over the number recorded in 1946.

The crude death rate for 1947 was 10.1 deaths per 1,000 estimated population. This is the second lowest rate ever recorded for the United States; the lowest was 10.0 in 1946.

* * * *

Children's Bureau

Forty spokesmen for the producers and consumers of health services for mothers and children met in Washington recently to form an advisory committee to the U. S. Children's Bureau on federal-state programs for maternal and child health and crippled children's services. The Children's Bureau is a unit in the Social Security Administration, Federal Security Agency. Among the members of the committee are Oscar L. Miller, M.D., orthopedic surgeon, Charlotte, North Carolina, and John Z. Preston, M.D., of Tryon, North Carolina.